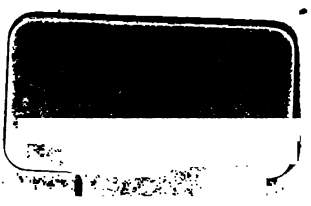

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SAILING DIRECTIONS

FOR THE

ENGLISH CHANNEL

AND

COAST OF FRANCE;

WITH AN ACCURATE DESCRIPTION OF THE

COASTS OF ENGLAND, SOUTH OF IRELAND,

AND

CHANNEL ISLANDS.

COMPILED FROM

TRIGONOMETRICAL SURVEYS & ORIGINAL DOCUMENTS.

TO WHICH ARE ADDED, DETAILED ACCOUNTS OF ALL THE

LIGHTS, SHOALS, BANKS, ROCKS, &c.,

TO THE PRESENT TIME.

By JOHN WALKER.

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SAILING DIRECTIONS

FOR THE

ENGLISH CHANNEL.

SECTION I.

PORT OF LONDON,
AND DIRECTIONS FOR THE RIVER THAMES TO THE NORE.

VARIATION 21½°.

*** *In these directions, all the bearings are magnetic, unless otherwise expressed, and the distances are stated in nautic miles, 60 miles to a degree of latitude.*

BEFORE we proceed to give directions for navigating the River Thames, it may not be improper to premise, that the jurisdiction for the conservancy of this river, with the waters of the Medway, and the fisheries therein, is one of the most ancient and honourable privileges of the City of London: the property of these rivers, and of the rivulets which fall into them, the fish, and the soil beneath, within certain boundaries, having been from time immemorial vested in its Corporation, and confirmed to the same by Royal Charters and Acts of Parliament.

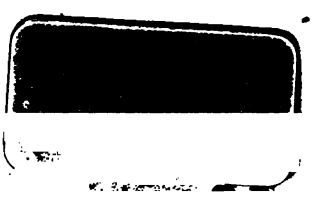
In consequence of this right of jurisdiction, the legislature have placed the shipping of the Port of London under the directions of Harbour Masters, appointed by the Corporation of London, and approved by the Trinity House. Agreeably to the above right, various by-laws and regulations have been from time to time enacted, "for the good government of the Harbour Masters of the Port of London, and for the more safe and convenient navigating, placing, mooring, unmooring, and removing of ships and other vessels, steam-boats, lighters, and craft," &c.

GENERAL NOTICES.—By a regulation of the Trinity House, all buoys placed over or near the wrecks of sunken vessels are Nun Buoys, painted of a green colour, and marked with the word "Wreck," in order to distinguish them from the regular direction buoys; but these remain only until the wrecks have been removed or dispersed.

It has also been determined by the same authority, that in future Gongs are to be used instead of Bells, on board the Light Vessels; and that where Vanes have been hitherto placed upon buoys, globular balls will be adopted; moreover that the buoys will not hereafter be numbered, but have the particular name of each buoy painted upon it.

A notice has been issued from the Trinity House, stating that the red flags exhibited during the day at the mast-heads of the several Light Vessels belonging to that corporation, will be discontinued, and that in lieu thereof, each of the said vessels will be distinguished in the day time by a red ball at the main mast-head, which in the event of the vessels driving from their proper stations, will be taken down.

The UPPER POOL, from London Bridge to Wappingness, lies S.E. and N.W. There is a shoal off the Custom House: as also a hard shelf abreast the middle tier at Horseydown, having only 6 feet water over it, to avoid which keep well over to the opposite side.



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cable; and at two-thirds of a mile above Tilbury Ness, it again stretches off to a cable and a-half. In approaching the Ness, the depth increases to 20 feet within half a cable. N.N.W., quarter of a mile from Tilbury Ness, is a shoal of 15 feet, with 4 fathoms between it and the shore. Ebb tide sets strongly in on the south-west side of this Reach, towards the chalk wharves at Northfleet.

GRAVESEND REACH lies E.S.E. and W.N.W. The north shore may be approached to within a cable's length, in not less than 20 feet depth, for two and a-half miles below Tilbury Ness; then shoal water begins to extend gradually from the shore, and when off Coal-house point, there is only 15 feet at a quarter of a mile from it. On the south side, from Northfleet creek to the town pier at Gravesend, there is deep water to within a cable's length of the shore; the bank then begins to shelve out and continue down the river for a mile and a quarter, with from 12 to 15 feet at 2 cables' length from the land; it again recedes towards the shore and abreast of Shone battery at a cable's length: the depth is 4 fathoms.

HOPE REACH lies N.E. and S.W.—A shelf begins at the Upper Hope, or Coal-house point, extending downwards the whole distance of this Reach. Off the Point it is called the Ovens flat, and dries to the distance of 2 cables at low water. The depth then suddenly increases; and at half a cable's length from the dry flat it is 5 fathoms. Gravesend mill in one with Denton mill, that stands a little distance from the water's edge, below Gravesend W. ¾ S., carries you along the dry edge of the shelf; Gravesend mill well open to the southward of Denton mill, or Mucking lighthouse, bearing N.E. ½ E., clears the shelf. When on this bearing at night, the light will appear bright; but if a vessel be too far to the west, it will show red,—a sure guide to keep it clear of the shelf. Off this shelf a buoy is placed in 5 fathoms water. When abreast of the bight at Mucking creek, the shelf dries to half a mile from the land and takes the name of Mucking flat; the water then gradually deepens, but at half way across the river to only 20 feet. On the Kent side of this Reach there is deep water at a cable's length from the shore, from Shone battery to Lower Hope point: large vessels in working up or down should keep at least two-thirds over from the Essex to the Kent side. Marks are placed at this Reach to enable steamers to measure their rates of going. Off the preventive station at Cliffe creek bring the two beacons in one, and then steer a N.E. course until the flagstaff and chimney at Lower Hope battery come in one: the distance run will then be exactly one nautic mile (2028 yards).

SEA REACH lies E.S.E. and S.E. b. E. ½ E.—Below Lower Hope point, Blyth sand begins and extends to Yantlet creek. Abreast of Hole haven it stretches half across the river, drying in parts at low water; and between it and Hole haven the depth of water is from 7 to 8 fathoms. At the west end of this sand, called Blyth spit, a beacon was erected, but having been washed away, it was replaced by a black buoy; the bearings from it are, Lower Hope point, W.S.W., and Mucking lighthouse, N. b. W. ½ W. On this bearing the light throws out a narrow stripe of Red, showing at night where the Blyth sand commences. Two miles and a quarter below Blyth spit, a nun buoy, with staff and square top, is placed in 18 feet water, at a cable's length outside of where the beacon formerly stood, named East Blyth, with the following marks and bearings:—a conspicuous round-topped tree on Canvey island on with the eastern point of Hole haven, bearing N.N.E., and Shell Haven house N.W. b. N. Yantlet Spit buoy lies about three and three quarter miles lower down; it is black, with East Blyth buoy bearing N.W. b. W. ½ W., and Chapman lighthouse N.N.W. ½ W., it is within half a mile west of Yantlet middle ground. On the northern shore, from where Mucking flat terminates, to Scar-house point, deep water is obtained to within from half a cable to a cable and a half distance from the shore. Mucking lighthouse is erected upon piles, on the outer edge of the sand that dries at low water, being about two hundred yards from high water mark; it is painted white, 40 feet above high water, and in foggy weather a bell is tolled; as it is placed at the turn of the river, where Long Hope Reach is parted from Sea Reach, it becomes a guide for both. The Scars are some rocky

spots stretching along shore from Hole haven to below the Scar houses; they are at a cable's length from the shore and steep-to, the edge being indicated by a strong rippling of the tide: the haven's mouth kept well open leads clear of them.

Off Scar-house point is the Scar elbow; from thence to Shoebury Ness the banks of sand and mud that dry at low water extend in some parts to upwards of a mile from the shore; they are called the Chapman, Leigh, and Southend flats. Further out in the river, but detached from these flats, lies Leigh middle ground, which has grown out of late years and now extends half way across towards the opposite shore; it has but 7 feet depth in some parts. Chapman beacon has been replaced by a lighthouse built upon piles: it is painted Red, has a Fixed light 40 feet above high water, and in foggy weather a bell is tolled. After passing the Mucking lighthouse, keep three fourths nearer to the north than to the south shore, or the lighthouse bearing N.W. b. W. $\frac{3}{4}$ W. will clear the Scar elbow and Chapman sand; at night, when to the north of this bearing, the light shows red, denoting being too near to the banks, but if to the south it will show bright.

The courses from off Hole haven to Leigh road are S.E. b. E. $\frac{1}{2}$ E. $1\frac{3}{4}$ miles, and E.S.E $\frac{1}{2}$ E. $3\frac{1}{2}$ miles; these lead down between the Blyth and the Chapman, within a quarter of a mile from the latter, and in the best water, 10 to 8, 7, 5, and $4\frac{1}{2}$ fathoms. Throughout this track the flood sets nearly west; it is very rapid, and the courses must be regulated accordingly.

YANTLET MIDDLE GROUND is one mile and a quarter off Yantlet creek, with 15 to 17 feet of water upon it. This bank narrows the channel between it and Leigh middle to three quarters of a mile.

In Fairway channel is Leigh road, a good anchorage; it lies between the two narrow banks, named the Leigh middle ground on the north, and the Nore sand on the south. These extend in a S.E. b. E. direction on each side. The shoal part of the Leigh middle ground lies athwart the entrance of Leigh haven, at a mile and a half from the shore; it is a mile and three quarters long, with 8 feet at low water; but the flat on which it lies extends further in the same direction.

At the south-western end of the shoalest part of the Leigh middle ground, a red buoy is placed in 13 feet water, named River middle buoy, and at a mile and a quarter below it, bearing S.E. $\frac{1}{4}$ E., another buoy is placed, striped red and white, in 16 feet water, called River middle east buoy; this makes the east end of the shoal water of the Leigh middle ground. Chapman lighthouse bearing N.W. b. W. $\frac{1}{2}$ W. just clears the Leigh middle, when to the north of that bearing and nearing the bank, the light shows red, and to the south it shows a bright light through the Fairway channel. At Southend, a pier is constructed on piles over the mud bank, and extending into the river upwards of a mile in about the direction of S. b. W. having a red light at the extremity; between it and the buoy marked "East River Middle," the depth is 7 to 9 fathoms. Leigh channel lies between the mud banks off the Essex shore and Leigh middle, being narrow and out of the way of vessels passing up and down the river; it is not used by large ships.

On the south side of the river, opposite the buoy of the East river middle, and one mile and a quarter S.W. b. W. from it, is the black buoy of the Jenkin, which is placed to facilitate the navigation of the swash called the Jenkin, lying between the Nore sand and the Isle of Grain. At a mile and a half below the Jenkin buoy, is the buoy of the Nore sand, and at 2 miles S.E. b. E. from the latter, is the Nore light. Therefore, in proceeding eastward from Leigh road, leave the black buoy of the Jenkin, the white buoy of the Nore sand and the Nore light, on the starboard; while the striped buoy of the Leigh middle, and the Shoebury buoys (black), are to be left on the port side.

From Leigh road, with not less than 4 fathoms of water, a direct course to the Nore light vessel is S.E. $\frac{1}{2}$ E., 4 or 5 miles, and to half a mile south of the west Shoebury buoy S.E. b. E. $\frac{1}{2}$ E., 3 or 4 miles, the depths varying from 3 to 5 fathoms at low water. Off Southend there is a bank called the Western Maplin, to the distance of 7 miles eastward, and its breadth, off Shoebury Ness, is a mile from the shore. A buoy, called the West Shoebury, lies in 3 fathoms, from it the Nore light vessel bears S.S.E. $2\frac{1}{2}$ miles S.E. b. E. $\frac{1}{2}$ E., $1\frac{1}{2}$ mile from West

Shoebury buoy is the Middle Shoebury buoy; and S.S.E. ½ E. 2¼ miles from that is placed the East Shoebury buoy: these three buoys are Black, and are about a cable's length from where the Maplin sand dries at low water.

The NORE LIGHT VESSEL lies on the eastern extremity of the Nore sand; it is situated at the distance of forty-one nautical or forty-seven statute miles from London Bridge. The hull of this vessel is painted Red, with "Nore" marked on her sides; she carries a ball at the mast head, and in fogs a gong is sounded. The light is bright, and revolves every half minute. The marks for the vessel are, Minster church on with the eastern part of a triangular field, called Mizen hedge, bearing S.S.W. ¼ W., the Garrison point at Sheerness W.S.W. ¾ W. distant 3¼ miles, and Great Wakering church N.N.E.

The anchorage at the Nore is from 6 to 9 fathoms, either to the eastward or westward of the light vessel, between the Bar and the Nore sand, with Minster church S.S.W. ¾ W., and the Nore light N. ¾ W. At the Little Nore, the anchorage is E.N.E., three quarters of a mile from Sheerness point; from the Nore light, W. b. S. 2½ miles; with Queenborough church, S.W. ½ S., on the west end of Turf redoubt, a little to the eastward of the town of Sheerness.

From the Great to the Little Nore and on to Sheerness harbour: bring Minster church S.S.W. on the first hollow of the land eastward of the most western cliff of Sheppey island, and stand towards it, until the house at Cockle-shell hard comes on with Garrison point bearing W. ¼ S.; steer with that mark on until Minster church appears upon the west end of the West cliff, or the white beacon and inner black beacon on Grain island come in one, bearing W. ½ N. Do not go far to the southward of that mark, nor to the northward of the mark having the southern tree on Grain island on with the outer black beacon: within these two marks you have the best channel until Garrison point bears S.W., then make towards it, and round it at any distance within 2½ cables; do not, however, bring that point to the south of S.W. b. W. that the shoal extending off the north coast of Sheppey may be avoided. A Martello Tower has been erected on Grain spit, N.W. ½ N. from Garrison point, half a mile distant from it.

Vessels, wind-bound, usually lie at Blackstakes, within the Medway, or below the west spit of Queenborough swale, in from 3 to 5 fathoms.

With ebb tide there is a strong eddy on the western shore, and at Sheerness another equally strong with the flood.

In order to facilitate the navigation through the Swatchway, between the Nore sand and Grain spit, a Red buoy, marked "Grain Spit," has been laid on the eastern part of the Spit in 9 feet low water, with the following bearings:—Garrison point, S.W. ¼ S.; Nore light vessel, E. ½ S.; and Jenkin buoy, N.N.W. In steering through, keep the Jenkin buoy about 2 cables' length to the north, and Grain spit buoy the same distance to the south.

Between Sheerness and Queenborough is a shelf of mud, called the Lapwell, which dries at low water. Sheerness reach extends S.W. b. W. and W.N.W. about 2 miles, having in its channel from 5 to 12 fathoms. Off the eastern shore of the Isle of Grain it is shallow to a considerable distance, the shoal extending eastward so as to form Sheerness middle ground, at the extremity of which is a Black buoy, having Garrison point bearing W. b. S. from it, and the Nore light vessel E. b. N. Off Garrison point the water is deep and steep-to. Lapwell bank, extending south-westerly from Sheerness, forms the bar of 12 feet at the entrance of Queenborough swale. On the west side of the entrance, close to where the bank dries at low water, a buoy, chequered black and white, is placed. A little above this is the anchorage.

TIDES.—The time of flowing and the vertical rise of the tide, on the full and change days of the moon, in the river Thames, are as follows, viz.:—At London Bridge, ten minutes past two; at Blackwall and Woolwich, five minutes past two; at Purfleet, three-quarters past one; and at Gravesend, half-past one. At Purfleet it rises 17, at Woolwich 18, and at London about 19 feet. At Hole haven it flows till three-quarters past twelve, and rises 15 feet; and at the Nore, till half-past twelve, and rises 15 feet. Allowance must always be made for easterly winds, because with such winds the tide flows sooner, and *vice versa*.

SECTION II.

FROM THE NORE TO MARGATE ROADS.

VARIATION 21¼°.

FROM Sheerness to the eastward, there is a large flat, called the Cant, extending a good distance on the north side of Sheppey, in a line with the bar or middle ground of Sheerness; it extends E.S.E. ½ E., about 5 miles. On the edge, in 4 fathoms, lies a white buoy, bearing S.E. b. E. ½ E. from the Nore light, and N.N.E. from Warden point, distant from each about 3½ miles.

The Spile runs in an E. b. S. direction, is a narrow shoal joining the Red sand, its breadth being less than a quarter of a mile, and having 2 feet on it. On the western extremity is placed a black buoy, in 12 feet water, with the following marks and bearings:—Shottenden mill, in a line with a conspicuous gap in a wood eastward of Leysdown church, S.S.W.; Minster east mill just open to the southward of Reculvers church, S.E. ¼ S.; the Nore light vessel, N.W. ¼ N.: this and the Cant buoy must be left on the port side.

Half a mile distant from the Spile is a shoal, called the Middle ground, partly dry at low water. The middle is the broadest part, the two extremities much narrower, and having 8 or 9 feet over them; a black and white buoy, chequered, marked "Middle buoy," is at the western end; Shottenden mill in one with the West muscle house in Sheppey, S.S.W. ½ W.; Reculver towers, their length on the west end of Cleave wood S.E. ¼ S.; and the west buoy of the Spaniard, S.E. ½ S. A Beacon has been placed on the south-eastern edge of the dry part of this sand about 2 miles from the above buoy, the bearings for which are,—Warden point, W. b. S.; Middle buoy, W. b. N. ¾ N.; and the East Gillman buoy, E. ¾ N.: this beacon and buoy must be left on your port side. The Gillman and this sand form the north side of the Five-fathoms channel.

The SPANIARD forms the south side of the Five fathoms channel; it has a buoy at each end, the western one being white, with a staff and black ball, from which Minster west mill is in one with the south side of Reculver towers, S.E. ¼ S.; Middle Spaniard buoy, E. b. N. ½ N.; Whitstable church tower, in a line with the centre of Whitstable tavern, S. ½ E.; and Spaniard east buoy, E. ¾ S.: this buoy is in 10 feet water. The east buoy of the Spaniard is black, having on it a staff and inverted cone; it lies in 10 feet water, with the west end of Cleave wood in a line with the west end of Lower Hale Grove, the black mill at Herne its width open westward of a white mill on the beach, S. ¼ E., and the west buoy of the Pan shoal S.E. by E. ¾ E. This sand is about 3½ miles long; towards the middle several parts dry at a low spring tide, near which is placed a white buoy; leave this sand on your starboard side.

The GILMAN, with only 6 feet water in one part, is on the north side of the Five Fathoms channel; it is about 2 miles in length, and narrow, being nearly in a line from the Middle sand to the West Girdler; between it and the Middle there is a depth of 15 to 18 feet for half a mile, and on its western side the channel 1½ mile wide to the Girdler. A buoy marked with black and white rings is placed at the east end of the Girdler at 1¼ mile W. by N. from the Girdler light vessel and E. ¾ N. from the beacon on the Middle.

Off the western end of the Margate sand is the Woolpack, which extends from it about 3 miles W. by N., and is nearly dry in some parts. The Last is to the south of the Woolpack, with a depth of 20 feet between them. The Hook, to the S.E. of the Last, and west of the south end of the dry part of the Margate sand, dries at low water to the extent of a mile, and has but 2 or 3 feet depth

for nearly 2½ miles. The Gore is a patch of sand, not 2 cables in length, with 9 and 10 feet over it, but lying in the fairway between the Horse and Gore channels, forming thereby a bar between them. Cliffend banks are also in the fairway of the Gore channel, but have not less than 16 feet over them; they are small, and lie a mile south of the dry part of Margate sand, and S.E. by E. of the dry part of the Hook. The Margate sands are about 7 miles long and 2 wide: the middle part dries at low water for 2½ miles in the direction nearly of east and west, and for upwards of a mile in breadth; it is covered at 8½ feet flood; the northern edge is steep-to.

Off Foreness is a rocky ledge, extending half a mile in a N.N.E. direction, called Long Nose. At the extremity in 5 fathoms is a red buoy with the name "Long Nose" painted on it.

The buoys lie as follow:—West Nun buoy of the Last, black, with a staff and ball, in 11½ feet on the port side. Marks: Reculver steeple, S. ½ E.; Stud hill, on the southernmost houses on Hampton hill, W. by S.; the low west end of Cleve wood upon the east end of Upper Hale grove; the middle buoy of the Last, E.S.E.; and the buoy of the Horse, S.E. ½ S.

Tail of the Horse, red, in 10 feet, on the starboard side. Marks: Waldershare monument midway between George's farm-house and the first house to the eastward of it; Reculver steeple, S. ½ W.; North Down tower, on the tip-end of the west cliff in Marsh bay, S.E. b. E.; the west buoy of the Last, N.W. ½ N.

Middle Buoy of the Last, black, in 10 feet, on the port side. Marks: Reculver steeple, S. b. W.; the Horse buoy, S.W. by S.; the east Last buoy, E.S.E.; west Last buoy, W.N.W.; Waldershare monument, appearing one-third of the distance from Reculver barn towards George's farm-house.

East Buoy of the Last, black, in 10 feet, on the port side, and on the southernmost part of the sand. Marks: the west end of the Chislet Miller's house, upon the east end of the first house next westward of Reculver tower, S.W. ¾ S.; the Horse buoy, W. ½ N.; the middle Last buoy, W.N.W.; the Gore Patch buoy, S.E. ½ E.

Gore Patch Buoy, striped black and white, in 6 feet, on the port side. Marks: west end of Cleve wood in a line with the Preventive station on Birchinton cliff, bearing S.S.E.; the east end of the Miller's house at Chislet in a line with the west end of Vantapeer farm buildings, S.W.; and the East buoy of the Last, N.W. ½ W.

HOOK BEACON, placed on the south-west edge of the dry sand of the Hook, is to be left on the port side; from it the marks and bearings are, Hillborough church open to the north of the Reculver spire, W. b. S. ½ S.; Birchinton west mill, S.S.E. ½ E.; and Gore Patch buoy, N.W. ¾ W.

South Margate Can Buoy, black, on the port side. Marks: North Down tower open south of Margate old church, S.E. ½ E.; St. Nicholas church tower in a line with the Preventive station, S.W.; Birchinton church, S. ½ E.; Reculver tower, W.

South-east Margate Nun Buoy, black, on the port side. Marks: Margate mills just open south of Margate-pier lighthouse, S.E. ¾ E.; Reculver tower, W. ¼ N.; Hook beacon, S.E. b. E. ¾ E., 2½ miles.

East Buoy of Margate Sand, black, with staff and inverted cone, in 4 fathoms. Marks: the cupola of Margate old church in a line with the chancel end of the new church; the high tower of Moro castle, between the second and third black cliffs to the westward of the south cliff at Kingsgate; a tree, which stands to the eastward of Minster East mill, just touching the north side of the Salt-water Bathing house, which has a middle gable at Nayland; the west end of Birchinton wood on with the east cliff of Westgate bay, and the North Foreland lighthouse, bearing S. ½ W., a little westerly, distant 4½ miles.

Long Nose Buoy, red, is placed in 5 fathoms, with Foreness bearing S.E., two-thirds of a mile and North Foreland, S. ½ E.

Directions for Sailing from the Nore, through the Five Fathom Channel, Horse Channel, &c., to Margate Road.

FIVE FATHOM CHANNEL.—In running down from the Nore, steer E.S.E. 3¾ miles; bring the Nore Light-ship on with the rising land within Yantlet point, bearing W.N.W. Keeping on this mark will lead along the edge of the Cant below the white buoy, till Leysdown church comes well open to the eastward of Warden point or the Land's end of the Sheppey bearing S.W. b. S., then steer S. b. W. ½ W. 2 miles for the Five Fathom channel, leaving the Cant buoy on the starboard, and the buoys of the Spile and the Middle ground on the port side, having from 9 to 12 feet at low water.

In working through the Five Fathom channel, tack immediately that the water shoals on either side. Over the Spaniard the flood sets strong towards the East Swale, and the ebb the contrary. The leading mark through is Minster church, in Sheppey, on with the middle of Bradgate bay, bearing W. b. N. The best water is on the north side, near to the Gilman, which is steep-to. The opposite side, near the Spaniard, is flat. The western part of the channel has from 12 to 13 feet; abreast of the Gilman from 12 to 18 at low water.

In working to the northward of the Cant, stand towards its edge to 8 fathoms to the northward, according to your convenience. Care should be taken to avoid the Cant knoll, a small steep shoal, with only 4 feet water, which lies on the Cant edge, to the southward of the buoy, with Warden point S. b. W. ½ W. and Minster church W. b. S. ¾ S.

In sailing to the southward of the Cant end shoals, across the Cant, keep the Nore light-ship in the middle of the valley, between the high land of Fobbing and the high land of the N.E. of Hole Haven. This leads near the west buoy of the Spaniard, and across the Cant in 9 or 10 feet low water, where the Five Fathom channel will be open. From the Nore to the west buoy of the Spaniard the distance is 5½ miles.

About half flood you may sail down on the Cant, should the wind be from the west and south, in the part where there are 2 fathoms at low water. At this time of tide vessels drawing 15 feet may sail to the entrance of the Five Fathom channel, by keeping the Nore light-ship N.W.

HORSE CHANNEL.—The course from the east buoy of the Spaniard to the west buoy of the Last, across the Flats, is S.S.E. ½ E. 5 miles. The depth is from 10 to 16 feet. Particular allowance must be made for the tide, which sets nearly across the beam. In running for the buoy of the Last, bring the west end of Cleave wood upon the east end of Upper Hale grove. In working, stand to the westward until St. Nicholas' church comes on with Reculver church, and to the eastward until Sarr mill nearly touches the Reculvers; in this course you will have not less than 9 feet at low water. If requisite to anchor before entering the Horse channel, bring up in Horseshoe hole, between the South knoll and Woolpack, in from 15 to 20 feet at low water, with St. Peter's church on the middle of Marsh bay, and the Reculvers S. b. W. ½ W., or with the Pan beacon open to the westward of the buoy of the South knoll.

The entrance of the Narrows lies between the Cross bank, with the Last on the south side and the Spell on the north. In entering here and working through, you must be guided by the lead and draught of water. Vessels of a draught of water to pass the Narrows may, with more safety, use the Horse channel at the times of tide they have been accustomed to pass the former. Those running down from the west buoy of the Last may steer for the Horse buoy, passing to the northward of it, and keeping the North Down tower open of the west cliff of Marsh bay, will lead across the ridge about two-thirds of the distance between the Gore Patch buoy and 8 feet at low water spring-tides on the main.

Below the two buoys, from the Horse channel, you enter the Gore channel on the S.W. of Margate sands; with the last mark continue on, leaving the striped buoy on the Gore patch on the port hand. Steering S.E. b. E., you pass to the northward of the white beacon buoy on the hook of Margate sand, the thwart mark for which is Moncton beacon, on the eastern part of upper Hale grove.

SOUTH CHANNEL.—The S.E. b. E. course, with North Down tower open of the west cliff of Marsh bay, is to be continued until Birchinton mill, bearing S. b. E., is on with Cliff end, and here you change the course to E. b. S. with the Reculvers W. b. N., which lead into and through the South channel, until you are off Longnose, with Margate new church (near Fort point) bearing W. b. S. The new church, being on an eminence, is a most conspicuous object. Its tower is square, surmounted with four turrets, and its height above the pavement 135 feet. Distance on the E. b. S, course, 6¼ miles. From the Gore you may pass to the northward of Cliffend bank, with Bishopton farm, which stands on the first high land westward of the Reculvers open a little to the northward of the same. This leads in a fair way, between the Beacon buoy on the hook of Margate sand and Cliffend bank; and, when Birchington steeple bears S. b. W., you will be to the eastward of it, and may proceed eastward, as most convenient.

To clear the point called Longnose, which lies off Foreness, keep Birchington Seed-mill nearly west, open of Ledge point; or all St. Margaret's steeple (near the South Foreland) in sight above the land. When the North Foreland light-house bears S.S.W. ½ W., you will be to the eastward of Longnose, which runs off N.E. two-thirds of a mile from Foreness, and has 5 fathoms close to it.

The usual leading mark for going to the southward of the Cliffend bank is, a small grove, appearing like a barn, kept open to the southward of the Reculvers. In the channel are from 4 to 6 fathoms. With Birchington steeple S.S.W., you will have passed the bank, and may stand toward Margate sand into 5 or 4 fathoms, and towards the shore into the same depth, until below Margate. Then stand toward the shore, until Birchington seed-mill comes nearly on with Ledge point, or into 6 and 5 fathoms, and into the same depth toward Margate sand.

MARGATE LIGHT.—A stone light-house stands on the pier head, upon the port side in entering. This light-house is in form of a handsome fluted column, 70 feet in height, and exhibits a red light, at 85 feet above the level of high water, which, in clear weather, may be seen at three leagues off. The light is kept up from sun-set to sun-rise, and by day a blue flag is kept hoisted during the time that vessels may enter. On the extremity of the jetty, or Jarvis' landing place, is a lantern light for the use of the fishermen, to prevent their running foul of it. The harbour of Margate is situate in a small bay between two extensive flats of chalk rocks, the Nayland on the west, and the Fulsam on the east, both of which are covered before high water. The artificial harbour is formed by a stone pier, which commences on the eastern side of the bay, around which the town is situate, and extends 800 feet to the westward, in an irregular curve, leaving the entrance open to the N.W. The average rise of spring tides at the pier head is about 13 feet and that of neap tides 8 feet; but spring tides ebb outside of the pier head and leave the harbour dry at low water. The jetty, of wood, extends outward from the foot of the pier, over the Fulsam rock, to the distance of 1100 feet, for the convenience of passengers, &c., landing from or embarking in the steam packets at low water. The pier and jetty belong to a joint-stock company. In a national point of view, the harbour in its present state can be considered only as affording the means of supplying pilots, anchors, and cables, &c., to vessels driven into the Roads in distress.—*Report of the Admiralty Commissioners*, 1840.

ANCHORAGES.—In the Gore, you may anchor in 5 fathoms, with St. Peter's church mid-way between the house and barn in Westgate bay, and with Moncton beacon on the middle of Upper Hale grove, S. ½ W. in 4½ to 5½ fathoms. With a northerly wind, you may anchor under Margate sand, off Westgate bay, with Margate old church on, or nearly on Nayland point, and Minster west mill on a barn in the bay, S. by W. ½ W., where you will have 5 and 6 fathoms, good ground.

Near the Hook, you may also anchor in about 5 fathoms, with Moncton beacon anywhere between the west side of Lower Hale grove and the middle of Upper Hale grove, and St. Peter's church on with the house in Westgate bay. In Margate Roads, you may anchor with Margate old church on the pier-head, bearing south, and Bishopton farm on the Reculvers W. ½ N. in 7 or 7½ fathoms.

Another position is at 1 mile lower, with Nayland and Minster east mills in one; Foreness S.S.E. ½ E. in 6½ or 7 fathoms. The last situation will serve with a southerly wind.

The EAST SWALE is a good harbour for small vessels, formed between the flats of Whitstable and Shellness; the Columbine sand lies at the northern entrance, and is marked by three red buoys; on the south side of the channel are three black buoys—the Pollard, Fisherman's and Whitstaple, this last being at the entrance of the channel, has a staff and ball. The mark for going in is, Harty church open north of the Preventive station, bearing W. ½ S.; this will lead up to between the Pollard and Ham Gat buoys; then a course W. b. S. ½ S. will carry you to the harbour, passing Shellness, on which is a beacon, at a cable's length on your starboard side.

On the south side, about 3 miles above Shellness is Faversham creek, having a beacon to distinguish its entrance. On the opposite side, on Sheppey is Harty village and church, and in the river between these two, at about two-thirds from the south shore, is a bank called the Horse, which is partly dry at low water, and 1¼ mile in length.

About 7 miles S.E. b. S. from the White buoy on the west end of the Spaniard is Herne bay; it has a handsome pier about 3,000 feet long; on its head there is a small lighthouse with a flag-staff.

From the Nore to the North Foreland, through the Oaze, Knob, Queen's and Prince's Channels.

This track is well buoyed, and bounded by the following sands:—the Oaze, Spile, Red sand, Shivering, North Knob, Knob, Girdler, Pan sand, Patch, Ridge, Tongue, Wedge and Margate sands.

The Oaze sand is about 4½ miles long and half-a-mile broad; the water over it is shallow, the middle part not having more than 6 feet; there is a buoy at each end, the one on the west end being red, with a staff and ball attached to it, and lies in 3 fathoms water. The marks for it:—the Nore light-vessel W.N.W. ½ W. 4¾ miles; Shottenden mill exactly midway between the two muscle houses near Shellness, on the east part of Sheppey, bearing S.S.W. ¾ W.; and the Black Tail beacon N.N.E. The east buoy is white and lies in 3 fathoms. Marks: the Oaze west buoy bears west 4 miles; Black Tail beacon N.W. b. W. 4 miles; Mouse light-vessel N.N.W. ¾ W.; the Shivering sand buoy S.E. ½ S. 2½ miles; and Minster church W. ¾ S. There is a good passage between the east buoy of the Oaze and Knob, with 4 fathoms near the buoy, but gets shallow in nearing the Knob.

Spile, Red, and Shivering sands.—The Spile stretches E. b. S. 1¼ mile, where it joins the Red sand, which continues in a similar direction for 2½ miles further, some parts of it dry at low water. The Red sand is separated from the Shivering sand by a small swatchway of only 7 feet water.

The buoys on the north side of these sands are, the East Spile, Red sand, and Shivering sand buoys; they lie in a line bearing from each other E. ⅛ S. and W. ⅛ N. Marks for the East Spile, which is striped red and white, are, Minster church on with the West Spile buoy W. ½ S.; Middle beacon S. b. E. ½ E.; for the Red sand buoy, which is painted red, Minster church W. ½ S.; the low mill on the east side of Herne bay on with two trees just to the east of the town of Herne S. ½ E., and the Reculvers S. b. E. ½ E.; and for the Shivering sand buoy, striped black and white, with a staff and ball; Ash church about midway between the village of Reculver and George's farm S. ¼ E.; Minster church, west, and the Girdler light-vessel S.S.E. 1¼ mile.

NORTH KNOB is a shoal with only 5 feet water. At its west end is a buoy striped red and white. It lies in 3 fathoms, and must be left on the port side. Marks:—North Down monument S.S.E. ¾ E.; Girdler light-vessel S. ½ E., and Maplin light-house N. b. E. ¾ E.

The KNOB is a spit of sand, with not less than 17 feet water; on its western

side is a red buoy in 4 fathoms, and should be left on the port side. The marks for which are, the Girdler light-vessel S.S.W.; Shivering sand buoy S. W. b. S., and the Maplin light-house N. ½ E.

The GIRDLER is an extensive sand bank, the northern edge forming the south side of the Black Deep for 7 miles in an east and west direction; and the south edge, with the Shingles bank, forms the northern side of the Prince's channel. It is divided into west, east and south Girdler, on each of which are dry patches.

At the western end of these banks a light-vessel is moored in 3½ fathoms; she is painted red, and carries a ball, with "Girdler" on her sides; during foggy weather a gong is sounded; she burns a bright light, which revolves every two minutes, with flashes every half minute; the light is 38 feet above the water. The marks are, Ash church spire midway between George's farm and Reculvers S. ½ E.; west end of Cleve wood open to the eastward of St. Nicholas eastern Coast-guard station S. b. E. ¾ E.; Redding-street beacon, its apparent length open to the eastward of North Down tower S.E. ¼ S., and Shivering sand buoy N.N.W. The northern edge of the Prince's channel is marked by the south Girdler buoy, Girdler Spit beacon, Prince's channel light-vessel, Shingles buoy, and Shingles beacon. The south Girdler buoy is red, and lies in 18 feet water, with the Girdler light-vessel bearing W. ½ N. 1½ mile; Girdler Spit beacon E.S.E. 1½ mile, and west Pan sand buoy S. b. W. ¼ W. The Girdler Spit beacon stands on the edge of a spit of sand, dry at low water; it is 45 feet high, having a triangle at the top; from it the Girdler light-vessel bears W. b. N. ¼ N. 2¾ miles; Reculvers S. b. W. ½ W., and St. Peter's church open to the north of Margate old church S.S.E. ¼ E. Shingles buoy is red; it lies with the Girdler Spit beacon bearing W. b. N. ¼ N.; Reculvers, S.W. b. S., and the Shingles beacon, S.E. b. E. ½ E. Shingles beacon, with a frame at the top, diamond shaped, 45 feet above low water, is placed at the south edge of the dry sand called the Shingles. Marks are, Tongue light-vessel in a line with the east Tongue buoy S.E. ½ S.; St. Peter's church seen to the west of Margate mills S. b. E.; Reculvers S.W. westerly; and the Girdler light-vessel W. b. N. ½ N.

The south side of the Prince's channel and the north side of the Queen's channel are bounded by the Pan sand, Ridge, and Tongue sands. On the Pan sand are two dry patches at low water spring tides, but are covered at 2 feet flood; on the Ridge and Tongue the depths do not exceed 2 or 3 feet in some parts. These sands extend in an E. b. S. and W. b. N. direction, nearly 6 miles.

The south-side of the Prince's channel is marked by the following buoys:—North Pan sand, N.E. Pan sand; North Tongue, N.E. Tongue and east Tongue. A light vessel is also moored near the eastern end of this channel. North Pan sand buoy, black, is in 4 fathoms water; in entering the Prince's channel, it is left on the starboard hand, but on the port hand in making for the Queen's channel, over the Flats; from it the Girdler light vessel bears N.W. ¾ N.; west Pan sand buoy S. b. W. and N.E. Pan sand buoy E.S.E. ½ E. 1½ mile; the N.E. Pan sand buoy is black, and lies in 5 fathoms water, with the north Tongue buoy bearing E.S.E. ¾ E. 1½ mile; Pan sand beacon, S.W. b. W. ½ W.; and Girdler beacon, N. b. E. ½ E. North Tongue, with staff and ball, is a Nun buoy, 1½ mile, E. by S. ½ S. from the N.E. Pan sand buoy; it lies in 6 fathoms water, with the following marks and bearings:—the west end of Cleve wood just open to the westward of Birchington west mill, south; Sarr mill twice its apparent length open to the eastward of Margate Hook beacon S. b. W. ¾ W., and Girdler Spit beacon N.W. ¼ N. N.E. Tongue buoy, black, in 4½ fathoms, and 1½ mile E. b. S. ¾ S. from the north Tongue buoy; it lies with St. Peter's church in a line with Margate new church, bearing S. b. E. ½ E.; Moncton beacon twice its apparent length on the east end of lower Hale grove, S. b. W. ¾ W.; and Shingles beacon, N.E. b. N. East Tongue buoy, chequered black and white, is in 4 fathoms; the marks are, the first house next east of St. Nicholas church in a line with St. Nicholas western Coast-guard station, S. W. ¼ S.; Minster

west mill in a line with the west end of the east cliff of Westgate bay, S. b. W. ¾ W.; west Tongue buoy, W. b N. ¼ N.; and Wedge buoy, W. b. S. ⅔ S.

At the eastern end of the Tongue sand, but in the Prince's channel, a light-vessel is moored in 10 fathoms, painted Red, and carries a Ball; she burns two fixed lights, the upper one Bright, 38 feet above the water, the lower one Red, 14 feet, and shown at the after part of the vessel; "Tongue" is painted on her sides; and during fogs, a gong is sounded. The marks for her are, Minster east mill on with the centre of the Coast-guard station in Westgate bay, S. b. W. ¼ W.; Margate old church, the apparent width of its tower open to the eastward of the Pier light-house, south; Shingles beacon, N.W. ¼ N., and north-east Spit buoy, S.E. ½ S. This light-vessel should always be passed to the northward.

To enter the Queen's channel, and to keep clear of the west side of the Pan sand (which has recently extended to the south and west) when passing over the Flats, a Nun buoy, chequered black and white, has been placed in 15 feet, at the outer edge, named West Pan sand buoy: the bearings from it are, Reculvers, south; Girdler light, N. b. W. ¾ W., and Pan sand beacon, E. ½ N. Pan sand buoy lies on the south-east edge of the Pan sand and is chequered black and white; it is rather more than half-a-mile S.E. ½ E. from Pan sand beacon, with the Girdler beacon bearing from it N.N.E.; west Pan sand buoy, W. b. N., and Pan sand Patch buoy, E.S.E.; south Knoll buoy, black, is in 15 feet low water, with Pan sand beacon bearing N.N.W. ½ W.; west Pan sand buoy, N.W. b. W., and Reculvers, S. b. W. ½ W.; Pan sand Patch buoy lies to the south of the Pan sand and ridge, in 4 fathoms, with Moncton beacon nearly south on with upper Hale grove; a conspicuous high tree to the eastward of Minster mill open to the westward of Birchington church, S. b. E., and Pan sand beacon N.W. b. W. ½ W.; west Tongue buoy, chequered black and white, is placed at about a cable's length south of a 5-feet patch, in 4 fathoms. Marks:—St. Peter's church open to the west of Margate new church, S. b. E. ¾ E.; Mount Pleasant open to the west of Birchington steeple, S. ¼ W., and Moncton on with the west side of east or lower Hale grove, S. b. W. ½ W. East Tongue buoy, chequered black and white, lies in 4¼ fathoms, with the Tongue light-vessel bearing N.W.; Margate north Spit buoy, S.E., and Margate old church, south.

The WEDGE is a small, narrow sand, which lies on the northern edge of the shallow water that surrounds Margate sands, having between them a channel of 4 and 5 fathoms. On the northern edge of the Wedge lies a red buoy, in 4 fathoms. Marks:—Moncton beacon on with the east Hale grove, S. b. W. ¾ W.; the new church near Fort point, Margate, S.S.E. ½ E., and the Pan Patch buoy, N.W. ¾ W., 2½ miles. Margate sand north Spit buoy is black; from it the Wedge buoy bears W. ¾ N., distant nearly 2½ miles; N.E. Spit buoy, E. ¼ N., and Tongue light-vessel, N. b. W. ¼ W.

A Nun buoy, striped black and white, is laid on the north-eastern projection of Margate sand, in 4 fathoms, with the following marks and bearings:—Thanet mill on the back land in one with the first house westward of Margate mills, S. b. W. ½ W.; North Foreland light-house, south; Tongue light-vessel, N. W. ¼ N., and Margate east buoy, S. b. E., 1¼ mile.

To the east of Margate sand is a Nun buoy, black, with a staff and inverted cone. It lies in 4 fathoms, at the extremity of the sand. Marks:—the high tower of Moro castle between the second and third black cliffs to the westward of the south cliff at Kingsgate; a tree which stands to the eastward of Minster east mill just touching the north side of the salt-water bathing house, which has a middle gable, at Nayland; the west end of Birchington wood on with the east cliff of Westgate bay, and the North Foreland light-house, bearing S. ½ W. a little westerly, distant 4½ miles.

Directions for sailing from the Nore to the North Foreland, through the Oaze, Knob, Prince's and Queen's Channels.

In sailing through the Oaze channel, steer from the Nore light E.S.E., about 4½ miles. The point of land about Yantlet being kept about a ship's length to the northward of the Nore light-vessel, will take you to the entrance of the channel, between the Oaze and Spile buoys, leaving the buoy of the Cant on your starboard hand. When the west buoy of the Oaze bears N.N.E., an E. b. S. course for 5½ miles will carry you through the Oaze deep, and along the edge of the Shivering sand, to a berth between the chequered buoy of the Shivering and the buoy of the Knob, passing the middle and east buoys of the Oaze on your port hand, and the east Spile and Red sand buoys on your starboard hand. On the western part of the Oaze channel are from 9 to 11 fathoms; further on, from 9 to 6 fathoms. In working down towards each side, stand on to 9, 8 and 6 fathoms. Keeping the lead going will secure you from danger.

KNOB CHANNEL.—When from Barrow deep you intend to pass through the Knob channel to the Prince's or Queen's channel, do not approach the east Oaze buoy nearer than two cable's length, and steer a S.E. course, until you bring the Girdler light-vessel to bear about S. b. E. You will leave the north Knob and Knob buoys on your port hand, and the east Oaze and Shivering sand buoys on your starboard hand. Steer towards the Girdler light-vessel, passing it on your port hand, if bound for the Queen's channel, but on either side, if for the Prince's channel. Observe, throughout the navigation of these channels, the tide is a beam tide, for which allowance must be made according to the wind and velocity of the tide.

PRINCE'S CHANNEL.—Between the Girdler and Shingles sands on the north and the Pan, Ridge and Tongue sands on the south, lies the Prince's channel. Its entrance is marked by the Girdler light-vessel, which may be passed on either side; but if on the north side, keep within a quarter of a mile of it, as at that distance the west Girdler shoals to 12 and 14 feet. From the light-vessel, your course is S.E. b. E. ¾ E., 3 miles, passing the south Girdler buoy one-third of a mile on your port side, and the north Pan sand and N.E. Pan sand buoys on your starboard side. The Girdler beacon will now bear north half a mile, and the Prince's channel light-vessel east 1 mile. Your course to the Tongue light-vessel must now be E.S.E. ¼ E. 5½ miles, leaving the light-vessel, Shingles buoy, and Shingles beacon on your port hand, and the north Tongue and N.E. Tongue buoys on your starboard hand. Pass the Tongue light-vessel, but to the northward of it; then by keeping the Shingles beacon open to the eastward of it, bearing about N.W., you will clear the Tongue and Margate sands, and leave the east Tongue, the N.E. Spit and Margate east Spit buoys on your starboard hand.

QUEEN'S CHANNEL.—From the Girdler light-vessel to the west Pan sand buoy across the Flats the distance is 2 miles, and the course S. b. E. ½ E. With the ebb tide, which sets strongly to the E.N.E., and the wind to the southward of west, keep to the windward of this course. In this course are from 2¼ to 3 fathoms; to the westward, the water is rather shoaler. Pass the west Pan sand buoy on your port hand, and your course from it should be S.E. b. E. ¼ E. for 2 miles, keeping about midway between the Pan sand and south Knoll buoys; this will bring you to abreast of the Pan Patch buoy, at the distance of one-third of a mile, the depth being from 3 to 5 fathoms. From thence the course through the Queen's channel, between the Wedge and Tongue sands, and to the northward of Margate Spit sand, is E.S.E. ½ E. 7½ miles, leaving the Wedge, Margate north Spit and N.E. Spit buoys on your starboard and the west and east Tongue buoys and light-vessel on your port hand. After passing the Wedge, do not approach the Tongue in less than 7 or 8 fathoms and the Spit of Margate sands in less than 9 fathoms, as both banks are steep-to. When the Tongue light-vessel bears about N.W. ½ W. and Margate N.E. Spit buoy W.S.W., a course due south or S. b. E. will carry you clear of the Margate Sands, in 4½ or 5 fathoms water.

Whilst waiting for the tide, a convenient place for anchoring is the Pan sand hole, between the Pan sand buoy and the beacon on the one side and Knoll buoy on the other; with the Knoll buoy bearing S.S.E. and the Standing beacon E. b. N. to N.E. rather more than half-a-mile distant; anchor in 4 fathoms, except with easterly winds there is also good anchorage between the Wedge, north Spit buoys, and the Tongue. Towards the lower part of the Wedge and Tongue sands, vessels may stand in to 6 fathoms. The upper part of these sands is steep-to and close to them 9 fathoms. In standing to the southward towards the north Spit buoy, be cautious of standing into less than 9 or 10 fathoms, and to the northward in 7 or 8. In mid-channel there is from 10 to 14 fathoms.

TIDES.—About and within the east buoy of Margate sand, the first of the flood current sets S. b. W. southerly; the middle of the stream sets west, and the last N.N.W. and N. b. W. The first ebb sets N.E., the middle S.E. and S.E. b. E., and the last of it south, and S. b. E. But between the east buoy and the shoal part of Margate sand, the first of the flood sets due south, the middle S.W., and the last N.N.W. and N. b. W. The first of the ebb sets N.N.E., the middle E.S.E., and the last S. b. E. and south.

Between the North Foreland and the Kentish Knock, the setting of the tide is extremely irregular; so much so that frequently, in the course of half a tide, the stream will set to every point of the compass. In these circular currents, or large whirlpools, the fishermen have sometimes found their nets coiled up, in the most curious manner, and too often rendered useless; and as the whirls are not stationary, they have it not in their power to avoid them, when driving off the Foreland.

In the Queen's channel, the tide flows on the full and change at 12, spring tides rise 15, and neaps from 7 to 8 feet. The velocity of the first is about $2\frac{1}{4}$ knots, and of the latter only 1 knot. Off the Foreland, the strength is considerably less.

At Margate, it flows at $11\frac{1}{2}$, and at the Reculver at $11\frac{1}{2}$; but the flood continues to run until 12, spring tides rise about 17 feet. In Margate Roads and at the Hook of the sand, they run with a velocity of about $2\frac{1}{4}$ knots; but near the shore the stream is weak. A great indraught sets into the east Swale, which influences the stream on the Flats. The flood here sets W. b. S.

In the Five Fathom channel it flows at 12; spring tides rise here 15, and neaps about 9 feet.

SECTION III.

MARGATE ROADS TO THE SOUTH FORELAND, INCLUDING THE DOWNS.

VARIATION 21°.

From Margate Roads to the Downs, ships outward bound must give Longnose a good berth, a ledge of rocks stretching northward two-thirds of a mile from Foreness, and which is partially uncovered at low ebbs. In sailing towards the Gull stream, keep Birchington church open of the east cliff of Margate, or Birchington seed mill open of Ledge point, until the North Foreland light-house bears S.S.W. ¼ W.: a course from thence S.S.E. ½ E. will lead to the entrance of Gull stream.

The different points from Foreness to Ramsgate succeed each other as follows:—At S.E. b. S., nine-tenths of a mile from Foreness, are Neptune's point and tower, (also called Whiteness) forming the north side of Kingsgate cove; thence at three-tenths of a mile S. ¼ E. is Hackendown point, the south side of the cove, with the Moro castle and ice-house. From Hackendown point, S. ¾ E. four-tenths of a mile, stands the pitch of the North Foreland; thence S.S.W. ¾ W. one mile is the north cliff of Broadstairs, followed by its little pier and cove, and distinguished on each side, at the entrance, by a beacon. This is only one-eighth of a mile broad to the opposite side. From the latter, the cliff winds south-westward 1 mile and seven-tenths nearly to Albion-place, and to the east pier of Ramsgate harbour.

The harbour of Broadstairs is formed by its wooden pier, about 100 yards in length, extending from the northern side of a cove. The entrance faces the S.W., but the harbour is much exposed to the sea, which is driven in by winds from the eastward. At spring-tides there is about 16 feet of water at the pier-head, and 10 at neaps, but the harbour is dry at low water, and, during spring-tides, nearly 100 yards outside the pier is left uncovered.

The North Foreland light-house is a white tower, of which the lantern is 184 feet above the level of high water; the light, brilliant and fixed, may be seen 6 or 7 leagues off.

RAMSGATE HARBOUR consists of an outer harbour formed by substantial stone piers, extending 1,310 feet into the sea, and enclosing an area of 42 acres, and an inner harbour or basin divided from the outer harbour by a stone cross wall. The piers are built on caissons at the surface of the chalk rock, and on the western pier head stands a handsome granite lighthouse which exhibits a Fixed Red light, while there are 10 feet water and upwards in the entrance, which is from about 2¾ hours before, until 3¼ hours after high water, and in the day time, the same depth is indicated when a Red ball is hoisted on the cliffs at Sion hill, bearing N. b. W. from the harbour entrance. One Green light is also shown upon the west cliff, and a second Green light in the lighthouse on the west pier, which two Green lights will indicate there is *less* than 10 feet water at the entrance of the harbour, and when in line, will lead in the best water through the old Cudd channel. When there are 10 feet and upwards at the entrance of the harbour, the Green light in the lighthouse will not be shown; and the Green light on the west cliff and the usual Red light in the lighthouse will constitute the leading lights through the aforesaid channel.

The entrance to the outer harbour is about 200 feet in breadth between the pier heads, where the depth at high water springs is 19 feet, and 16 feet at high water neaps; at low water springs there are 6 feet, but a third of the way across

the entrance from the lighthouse is a bank with only 4 or 5 feet water on it at the same time of tide. Close to the eastern pier end a vessel of 8 feet draught may lie afloat, and come in or out except at very low ebbs, but these depths are very much influenced by the prevailing winds.

In the outer harbour are gulleys about 140 feet wide, close to and parallel to the piers in which vessels are safely moored alongside each other in tiers. The eastern gulley is the deepest and widest, having 4 to 5 feet at low water over a muddy bottom; the western gulley has only 3 feet in it over a chalky bottom, and is altogether, from the undulation, the most uneasy. Two banks, the East and West, rise in the harbour; the former dries 6 feet, and the latter 4 feet, above low water springs, and between them is a channel which dries in spots, leading to the gates of the inner harbour. The East bank is just awash at the time the tide ball is hoisted, which indicates 10 feet in the harbour, and being composed of sand and mud is of great service to vessels to run upon that come into the harbour with loss of anchors. At the head or northern end of the eastern gulley is a fine patent slip 450 feet in length, 350 feet of which is available for the reception of two vessels at the same time, of from 300 to 500 tons burthen, and drawing in ballast from 12 to 14 feet water.

The inner harbour or basin is used for vessels to load or unload, and is also a means for scouring the outer harbour by sluices, and contains a dry dock, and two building yards; but the business of the port consists principally in the repair and refit of distressed vessels. The inner harbour is 1,520 feet in length, 500 feet in breadth at the centre, and 350 feet at either end, and carries a depth of from 14 to 10 feet water. It is entered by single gates, as great dispatch is required when vessels are driven into the harbour in bad weather; and when there are many vessels in it the gates are kept closed to keep them afloat, as accidents may occur by vessels of unequal draught grounding alongside each other, or by falling over and getting damaged by the hard chalky bottom. The eastern entrance is 32 feet, and the western entrance 40 feet in breadth, and the depth over the sills is 14 feet at high water springs, and 12 feet at neaps with northerly winds, but 2 feet less with southerly winds. The dry dock is 150 feet in length, 40 feet in breadth. and 30 feet wide at entrance, with 11 feet water over the sill at high water springs and 8 feet at neaps, but the depth is entirely dependent upon the prevailing winds.

ANCHORAGE.—The anchorage off Ramsgate is very good with the wind between N.W. b. W. and N.E. b. N.; but with westerly, southerly or easterly winds a great deal of cross sea gets up, which, with a strong flood, makes it an uneasy roadstead. Anchor with Ramsgate church and lighthouse in one, and Cliff end farm on with Cliff end, in about 15 feet at low water over a chalk bottom, or farther in-shore, according to the vessel's draught; but if drawing more than 12 feet she had better anchor in Ramsgate Hole, which is easily found by bringing Minster mills in one with Cliff end, and St. Lawrence church just open to the eastward of the two mills and square tower on the west cliff, in 18 feet water over a clay bottom.

RAMSGATE CHANNEL extends from Small Downs to Ramsgate, to the westward of the Brake, and the only dangers in it are the Cross ledge, and a flat, which extends from the shore, abreast of No. 2 Battery. Vessels of more than 11 or 12 feet draught should not use this channel at low water springs, as there is not more than 12 or 13 feet in it, from the Fair-way buoy (white) to Ramsgate, a distance of about 2 miles.

DIRECTIONS.—In running for Ramsgate from the Small Downs, with a S.W. gale, a vessel should weigh before the tide has done running to the southward, and keep the gap in the cliff west of Ramsgate on with West Cliff lodge, or St. Lawrence church on with the eastern part of the trees round the lodge, bearing N. b. E. ½ E., which will lead to the Fair-way buoy (white), where she should heave-to until the 10 feet tide-ball is hoisted on the staff on Ramsgate cliff; from thence the Obelisk in Ramsgate harbour in one with the western pier head, bearing N.E. ½ N., will lead between the Cross ledge and Sandwich flats, towards the entrance of the harbour. In approaching the harbour, the

position of the red buoy off the entrance will show the direction of the tide; but as a general rule it may be considered that it does not set across the entrance to the eastward until an hour after the tide-ball is hoisted, when there is about 15½ feet water, which is, therefore, the best time for entering, as no allowance is then necessary for tide. At an hour before and for two hours after high water, the tide sets with great velocity across the piers to the eastward; and as great care must then be taken in entering, the following rules are necessary for the seaman's guidance: Sail should not be shortened before the harbour is entered, as the back set and broken water is sufficient to stop a vessel's way, and make her steer badly, and also run the risk of being set against the eastern pier; keep close to the red and black buoys outside the western pier head until within 100 feet of it, then port the helm a little to clear the head, and when a vessel's length inside luff and pick up one of the buoys seen in the direction of the tide-ball, when the harbour-master's boat will be in attendance to direct to a proper berth. If the wind is light it will be advisable to go to the northward of the red buoy, and between the black buoy and the lighthouse, to ensure getting into the harbour, as the tide sets strong against the eastern pier head. If running in with loss of anchors, port the helm immediately on entering, and steer for the Clock-house, and ground the vessel upon the eastern bank.

In turning through Ramsgate channel from the Small Downs, stand towards the shore by the lead, keeping a look-out for St. Lawrence church coming on with West cliff lodge, which is a good mark for going about when approaching the flats off No. 2 battery; tack towards the south-west part of the Brake when the water deepens to 4½ or 5 fathoms, as that part of the sand is steep-to; but when as far up as to bring Sandwich churches to bear W. b. N., go about, when the North Foreland lighthouse comes on with Dumpton point; and as there is good reason to believe that this part of the Brake increases to the westward, a good look-out should be kept for the ripple, and not trust too much to the marks. To clear the western edge of the Cross ledge, tack when the tide flag staff is just seen to the eastward of Ramsgate church; but when the tide-ball is hoisted, there are 14 feet over the ledge.

TIDES.—It is high water at Ramsgate at $11^h\ 15^m$; rise at springs, 13 feet, at neaps, 10 feet, with southerly winds; but these depths are increased 2 feet with northerly winds. The time and duration of high-water level are very much accelerated or retarded by prevailing winds; northerly winds rising the level rapidly on the flood, and causing it to hold up on the ebb in an extraordinary degree, and southerly winds are as decisive in the opposite effect and results.

CLIFF END CHANNEL is the passage between the Quern and the north shallow of the Brake, and has 8 or 9 feet through it at low water, but as it is not buoyed, and as the tide runs across it, it is not much used, except by the luggers going to and from Ramsgate and the Gull stream. The marks to lead out to it from Ramsgate are, Ramsgate church and the Royal hotel (painted red) in one, until the right hand part of the trees at Cliff end farm is over the left part of the White Cliff end. From thence steer S.E. ½ E. with the trees gradually closing over the Cliff end until a conspicuous saddle hummock in the trees comes on with Cliff end; keep these marks on until the North Foreland lighthouse is in one with the middle of Broadstairs, then steer more to the eastward, closing the hummock over the cliffs; when the North Foreland lighthouse is open of the north cliff of Broadstairs, a vessel will be clear of the Quern and Brake in about 11 or 12 feet at low water, and may haul up N.E. or S.W. as convenient.

To approach this channel from the Gull stream, the hummock trees should be brought to overlap Cliff end, bearing about N.W. ½ W.; then steer for them, gradually bringing them on as the North Foreland lighthouse comes in one with the town of Broadstairs; then open the hummocks gradually until Ramsgate church is in one with the Royal hotel. With Cliff end trees just overlapping the Cliff end, there is not less than 7 feet water leading over the north part of the Brake.

OLD CUDD CHANNEL is the narrow passage between the Quern and the

Dike, and carries a depth of 9 feet at low water springs. There is no difficulty in navigating this channel, as a white buoy marks the north end of the Quern and a black buoy the south end of the Dike. To approach it by day, bring Mr. Pugin's house, which has a square tower and stands on the west cliff, its apparent breadth open to the southward of the pier; or the lighthouse closed one-third of the way on the left of the Royal Crescent; steer with these marks on between the buoys, and then W. b. S., and when Ramsgate church is in one with the end of the chalk cliff, a vessel will be past the shallows and may steer for the harbour.

The leading mark through this channel at night when there are less than 10 feet water at the entrance of Ramsgate harbour is, the Green light on the west cliff in one with the Green light in the lighthouse; but when there are 10 feet and upwards at the entrance of the harbour, the Green light in the lighthouse on the west pier will not be shown, and the Green light on the west cliff and the usual Red light in the lighthouse will lead through the channel.

Captain Martin, the harbour-master at Ramsgate, remarks:—"This channel cannot be recommended to sailing vessels at night during an ebb tide, as it is attended with considerable risk, for when the western tide makes (at half ebb) it does not set fair through the channel, but shoots across it on to the outer shoal, and if a vessel is not very quick with her helm, she is on shore; this is continually happening with fishing vessels and small coasters; the cause is obvious, for the inner shoal curving off from the shore throws the tide obliquely across the channel."

GOODWIN SANDS.—These well-known sand banks have been divested of much of their danger since the present excellent system of lighting and buoyage has been completed, and they can now be approached fearlessly in fine weather, as their limits are well marked by light vessels and buoys. Along their eastern and northern edges large patches dry at low water, and remain uncovered for some time, offering fine tracts of levels and very firm ground. When covered, the sands are in motion, and are carried by the prevailing tides, which at times considerably alter the form of the shoal, though its general outline does not greatly change.

The sands are divided into two divisions, each tapering to the southward. The northern division, called the North Goodwin, is of an irregular semicircular shape, the northern or outer edge forming the curve, and the southern the base. That portion of the southern division which lies to the eastward is called the South Goodwin and South Calliper, and that to the westward the Bunt and Fork. The northern part of each division is dry in many places from 7 to 4 feet above low water. Between the South Goodwin and the Fork is the deep inlet called Trinity bay, from which there is an outlet to the north east through the Swatchway which is much frequented by the boatmen of the coast, and which undergoes many changes.

The SOUTH SAND HEAD LIGHT-VESSEL is moored in 13 fathoms, about three-quarters of a mile to the south-westward of the southern extremity of the South Goodwin, and shows a Fixed light at 38 feet above the water. A Red ball is hoisted during the day, and a gong sounded in foggy weather; South Sand Head is painted on her sides. The South Foreland upper lighthouse bears W. ¼ N., and the Gull light-vessel N.N.E. ½ E. Ripple mill in one with south cliff of Kingsdown N.W. ¼ N., leads close to the northward of the light-vessel and two-thirds of a mile to the southward of the South Sand head; and Upper Deal mill in one with Walmer castle, bearing N.W. b. N., leads midway between the South Sand head and light-vessel.

The GULL STREAM LIGHT-VESSEL is moored in 8½ fathoms about three-quarters of a mile to the westward of the western edge of the North Goodwin, and exhibits Two Fixed lights placed horizontal on separate masts, at 14 feet above the water; "Gull" is painted on her sides, and a Red ball hoisted during the day at each mast-head, and a gong sounded in foggy weather. The following are the bearings from the vessel:—Ramsgate church tower in line with the middle of Albion hotel at Ramsgate N. ¾ W.; Upper Deal mill its length on

the outer end of Deal pier S.W. b. W. ½ W.; South Foreland high lighthouse S.W. ¼ W.; South Sand head light-vessel S.S.W. ½ W.; South Brake buoy S.W. ¾ W.; Middle Brake buoy N.N.W. ¾ W.; Gull buoy N.E. ½ N., and the North Sand Head light vessel E. b. N. ¼ N.

The GOODWIN or North Sand Head LIGHT-VESSEL is moored in 10 fathoms, about a mile to the eastward of the northern extremity of the Goodwin Knoll, and is principally intended for the use of vessels coming from the northward. She exhibits Three Fixed lights forming a triangle on three separate masts; those on the fore and mizen are 28 feet, and that on the mainmast 42 feet above the water. A red ball is also carried at each mast-head by day, and a gong sounded in foggy weather; "Goodwin" is painted on her sides. The North Foreland lighthouse bears N.W. ¾ N.; Ramsgate pier lighthouse N.W. b. W. ¾ W.; the South Foreland high lighthouse S.W. b. W. ½ W., and the Galloper light-vessel N.E. easterly 28½ miles. St. Peter's church in one with Broadstairs cliff bearing N.W. leads about 1½ cables to the southward of the light-vessel, and 6 cables' lengths to the northward of the northern edge, in 20 feet, of the Goodwin knoll.

BUOYS on GOODWIN.—The eastern side of the Goodwin is marked by four large nun buoys, viz.: a high red buoy, surmounted with a triangle, is moored in 12 fathoms at the north-eastern edge of the North Goodwin, with the North Foreland lighthouse bearing N. b. W. ¾ W., the Goodwin light-vessel N.N.E. ¾ E., and the Gull light-vessel W. b. N.; a black buoy, surmounted with staff with diamond top in 15 fathoms off the Swatchway and abreast of the Trinity beacon, with the Gull light-vessel N.W. ½ N., and the Goodwin light-vessel N.N.E. ½ E.; a striped (horizontal) black and white buoy, with staff and cage, in 14 fathoms off the northern part of the South Calliper, at 2 miles S.W. ½ W. from the Swatchway buoy, with the South Sand Head light-vessel W. b. S. ½ S., the Gull light-vessel N. b. W. ½ W., and the Goodwin light-vessel N.E. b. N.; and a high black buoy with staff and ball in 8½ fathoms off the southern part of the South Calliper at about 1¾ miles S.W. b. W. ½ W. from the South Calliper buoy, and 2¾ miles E. ¾ N. from the South Sand Head light-vessel.

A vessel should keep half a mile to the eastward of all these buoys in passing them, as the tide sets with great strength to the north-westward, towards and over the Goodwin.

The Bunt Head buoy (black and white, with circular stripes) is placed on an elbow of the Goodwin, which projects to the westward into the Gull stream. The buoy is moored in 4 fathoms, with St. George's church at Ramsgate in line with the eastern Pier head, bearing N. ¼ E.; the Gull stream light-vessel N.E. b. N., and the South Brake buoy W. ¾ N.

Goodwin knoll.—A knoll of very considerable extent, with only 8 feet water on it, has grown up to the northward of the North Goodwin, and lies much in the way of vessels passing into and out of the Gull stream when rounding the North Sand head. A striped red and white buoy is laid down near its western edge in 5 fathoms, with Southwood house in one with the obelisk on Ramsgate pier N.W. b. W.; the North Foreland lighthouse N.N.W. ¼ W.; the Gull buoy N.W., and the Gull light-vessel W.S.W. ½ W. 3¾ miles.

DEAL BANK, of which coasters and small vessels in standing inshore must be very cautious, lies off Deal town at two-thirds of a mile from the shore, with only 16 feet on it at low water springs. A red buoy is moored in 6 fathoms a little to the eastward of the bank, with Upper Deal mill in line with the south end of Deal barracks, bearing W. ¼ S., and East Bottom semaphore house in one with the south cliff of Old Stairs bay S.W.

BRAKE SAND and BUOYS.— This narrow, but extensive sand, which is about 4½ miles in length in a N.N.E. and S.S.W. direction, and half a mile in breadth within the 2 fathoms line, has several shoal patches on it, carrying from 2 to 9 feet water; the sand is marked by the following buoys:—

South Brake buoy (a mast buoy with round head, painted black) lies in 5 fathoms water at the southern extremity of the sand, with Northbourne mill in line with a barn next north of Sandown castle bearing W. ½ N.; Broadstairs

high mill in line with a conspicuous mark in the cliff to the eastward of East Cliff lodge N. b. E. ½ E.; Bunt Head buoy E. ¾ S. distant six-tenths of a mile; Gull light-vessel N.E. ¾ E., and middle Brake buoy N.N.E.

Middle Brake buoy (chequered red and white) lies in 5½ fathoms water near the eastern edge of the sand about N.N.E. 2 miles from the South Brake buoy, with the South Foreland high lighthouse bearing S.W. ¼ S., and the Gull light-vessel S.E. b. S.

North Brake buoy (red) lies in 3 fathoms water on the north-eastern part of the sand, at about N.E. ½ N. 2⅓ miles from the Middle Brake buoy; with the North Foreland lighthouse bearing N. ¾ E., Ramsgate lighthouse N.W. ¾ W., and St. Lawrence church in one with the east cliff at Ramsgate.

NORTH BAR is a small knoll recently grown up, with only 12 feet water on it, and is marked with a black buoy, lying with St. Clement's church at Sandwich its breadth open to the southward of Woodnesborough church, bearing W. ¼ S.; St. Lawrence mill N.W. ½ N.; Gull buoy N.E. b. E., distant three-quarters of a mile; Goodwin light-vessel E. b. S. ¼ S. 3¾ miles, and Gull light-vessel S.W. ¾ S.

GULL SAND is a narrow ridge about a mile in length, in a N.N.E. and S.S.W. direction, on the middle of which, and near its shoalest part of 20 feet water, a white buoy is placed with Ramsgate and St. Lawrence churches in one, bearing N.W. b. W., and the North Foreland lighthouse N. b. W. ¼ W. There is a depth of only 22 feet at a third of a mile to the S.E. of the buoy, so that ships of large draught should keep without that distance in passing it.

The ELBOW is a small shoal in the form of an elbow, having from 18 to 26 feet water on it, and is marked by a chequered black and white buoy surmounted by a staff and ball, which is laid down in 3½ fathoms, with the North Foreland lighthouse bearing N.W. b. W. 2¼ miles; St. Lawrence church tower a good ship's length open to the northward of Dumpton point W. ¼ S.; the Gull buoy S.S.W. 2⅓ miles, and the east buoy of Margate sand N. b. W. ¾ W. As there are various shoal patches of 16 and 18 feet in the passage between this shoal and the shore, it should therefore never be attempted but by those well acquainted with its navigation.

BROADSTAIRS KNOLLS.—We have already noticed the shoal patches between the Elbow and the shore, but there are other numerous patches in the Inner channel to Ramsgate, to the westward of the Elbow and Gull sands, which renders it unfit for any but small vessels. Of these we shall notice the Broadstairs knolls, which lie directly off Broadstairs with from 13 to 20 feet on them at low water. They are marked by a black buoy in 4 fathoms, at about a mile from the shore, with the North Foreland lighthouse bearing N. b. W. ¾ W. and Broadstairs pier N.W. b. W.

ANCHORAGE IN DOWNS.—The anchorage called the Downs is comprised between Walmer and Sandown castles to the eastward of the red buoy on Deal bank. A good berth for large ships will be found in about 8 fathoms over a chalky bottom, with Upper Deal church a little open to the southward of Deal castle, bearing W.N.W., Sandwich church just seen to the northward of Sandown castle, N.N.W., and the South Foreland high lighthouse (the low lighthouse not seen) in the middle of Old Stairs bay, S.W. ½ W. It is recommended that men-of-war and the largest class merchant ships should not anchor to the northward of the line of Upper Deal church in one with Deal castle, and that vessels of about 16 feet draught should select that portion of the Downs to the northward of these marks anywhere near the line of East Bottom telegraph house in one with the highest part of the southern extremity of Old Stairs bay. When anchored, a bearing should always be taken of the South Brake buoy, to enable a vessel to run for the Gull Stream in case of parting or being obliged to slip. Moor with open hawse to the southward.

The anchorage in the Small Downs lies between Sandown castle and No. 2 battery, abreast of the south end of the Brake. It is by far a more secure anchorage than the Downs, and for vessels of less than 15 feet draught much to be recommended, not only for its being more sheltered, but having better holding

ground, shoaler water, and not so liable to be drifted upon by other ships. From this position, also, in a case of necessity they have greater facility for running to Ramsgate harbour.

TIME BALL.—A time ball has been established in the Royal Naval yard at Deal for the purpose of giving Greenwich mean time to passing vessels. The ball is raised half-mast high at five minutes before 1 p.m. *nearly*, and raised to the mast-head at three minutes before 1 p.m. *nearly*, every day. At the instant of 1 p.m., Greenwich mean time, the ball will be dropped, and the time to be noted is the instant at which the ball begins to fall from the cross arms of the vane. Should any derangement of the machinery prevent the ball from being dropped at 1 p.m., it will be kept at the mast-head for ten minutes, and will then be lowered gradually; it will again be raised and dropped by hand at 2 p.m. Greenwich time, but the accuracy of this time cannot be guaranteed within two seconds.

DIRECTIONS.—A vessel bound into the North Sea from abreast of the South Foreland should either pass to the southward of the South Sand Head light-vessel, and to the eastward of the Goodwin; or, if intending to run through the Gull Stream, should round the Foreland at the distance of about half a mile, in from 12 to 14 fathoms, and when the South Foreland lighthouses are in one, bearing W. b. N., and Deal town opens of the cliffs, she should steer N.E. ½ N. until Sandown castle bears W. b. N., when she will be near the entrance of the Gull Stream between the Brake and Bunt buoys. The course must now be altered to N.E. ½ E., to bring the South Foreland high lighthouse in one with the Coast Guard house in Old Stairs bay, bearing S.W. ½ W., which will lead in the deepest water through the Gull Stream, and direct for the Gull light-vessel. Keep on this course till abreast of the Gull buoy, or keep the Gull light-vessel on a S.W. ½ W. bearing, until the North Foreland lighthouse bears N. b. W. ¼ W., or the town of Ramsgate N.W. b. W. ½ W., when the course may either be shaped to the north-eastward or altered to N.N.E. for the Elbow buoy; from thence a N. b. W. ¾ W. course may be steered for the east buoy of Margate sand, taking care to allow for a beam tide. These directions must be attended to at low water, by a vessel drawing from 15 to 24 feet and a berth of half a mile given to the Gull buoy, as shoal water extends some distance to the eastward of it; however, the Gull light-vessel bearing S.W. ½ W. will lead well clear.

It will prove a very useful remark that, whenever the ships in the Downs are swung to the N.E., or the tide is running to the N.E. past the buoys, there is at least 8 feet perpendicular rise of tide above the level of low water springs. A vessel, therefore, not drawing more than 21 feet water may at that period safely steer N.N. E. ¾ E. from the South Brake buoy, passing half a mile to the eastward of the Middle Brake buoy, and a quarter of a mile to the eastward of the North Brake buoy; St. Lawrence church will then be on with the East cliff at Ramsgate, or Ramsgate lighthouse will bear N.W. b. W.; from thence a N.N.E. course will lead to the eastward of Broadstairs Knolls buoy, and about 1 mile to the westward of the Elbow buoy.

A vessel in the Downs parting her cables, or obliged to slip during a southerly gale and run through the Gull Stream, should endeavour to bring the South Foreland high lighthouse in one with the middle of Old Stairs bay, bearing S.W. ½ W. and keeping it on that bearing pass to the westward of the Gull Stream light-vessel; from thence she should steer to the north-eastward with the light-vessel in one with the South Foreland lighthouse, or the light-vessel bearing S.W. ½ W., and when the North Foreland lighthouse bears N.W., or the North Sand Head light-vessel S.E., she may haul out to the eastward and lie-to. If wishing to regain her anchorage by turning to windward at the back of the Goodwin, in standing into that sand she should not bring the North Sand Head light-vessel to the eastward of north, nor stand into less than 30 or 28 fathoms, until she is at least a mile to the southward of the Swatchway buoy, when the light-vessel may be brought as far to the eastward as N.N.E. When the South Foreland lighthouses are in one, bearing W. b. N., she will be to the southward of the Goodwin, and may bring Upper Deal mill in one with Walmer castle

bearing N.W. b. N., which will lead mid-way between the South Sand Head light-vessel and South Sand Head, or she may pass the light-vessel close-to on either side, and bear up for the Downs.

A vessel should not attempt to turn through the Gull Stream to the southward until half ebb, or to the northward until half flood. When working to the southward from the Longnose buoy, which lies nearly three-quarters of a mile to the north-eastward of Foreness, the course to clear the shoals off the North Foreland, and to lead half a mile to the north-eastward of the Elbow, is S.S.E. ½ E.; from thence the water will gradually deepen from 6 to 9 fathoms in the direction of the North Sand Head light-vessel. In standing towards the Goodwin Knoll, and along the north-west side of the North Goodwin, a vessel should go about when the Gull light-vessel comes on with the houses in the middle part of Deal; and in standing towards the Gull and the shoals to the southward of the North Brake buoy, she should tack in 6 fathoms, or when the South Foreland high lighthouse is in one with the north cliff of Old Stairs bay; but when about three-quarters of a mile from the Gull light-vessel, or when the Middle Brake buoy is in one with No. 2 battery (which stands to the northward of Sandown castle), she may stand more towards the Brake and tack in any convenient depth, about the line of the North Foreland lighthouse twice its apparent breadth open to the eastward of the north cliff off Broadstairs. In standing to the eastward across the Gull Stream to the southward of the light-vessel, keep a look out for and tack short of the Bunt Head buoy, and be careful not to bring the South Foreland high lighthouse to the eastward of East Bottom semaphore, or the Gull light-vessel to the northward of N.E. ½ E. as the Bunt Head projects well into the Gull Stream.

In standing off towards the Goodwin to the southward of the Fork, or when Sandown castle bears about W.N.W., a vessel should go about when the South Sand Head light-vessel bears about S.W. ½ S., when she will have the depth of 10 fathoms; when Walmer castle bears W. b. N. ½ N., 12 fathoms; and 13½ fathoms when within a mile of the light-vessel. In standing towards Deal, tack when East Bottom semaphore is in one with the south cliff of Old Stairs bay, or short of the red buoy, to avoid Deal bank, which has only 16 feet on it at low water springs. From thence to the South Foreland the shore may be approached to any convenient depth.

SECTION IV.

DOVER STRAIT, AND COAST FROM THE SOUTH FORELAND TO BEACHY HEAD.

VARIATION 21°.

THE course from the South Foreland to Dungeness is W.N.W. ¼ W. and the distance 20½ miles, the depth of water varying from 17 to 13 fathoms. When turning to windward in thick weather either up or down channel, between Dungeness and the Foreland, a vessel when standing in-shore should not go into less than 12 fathoms which will keep her to the southward of the banks near Dungeness, and of the rocks off Folkstone. Between half flood and half ebb she may stand freely off, bearing in mind, however, that there is not more than 17 feet at half ebb on the Ridge; but after half ebb all vessels should endeavour to keep between the Varne and the English coast by tacking near the Varne when the South Foreland lighthouses bear N.E. ½ N. In standing in-shore at night between Hythe and Eastware bay, a vessel should go about when the South Foreland lights are shut in by Shakspeare cliff; off Folkstone, the helm should be put down when the high light disappears.

SOUTH FORELAND.—The land about the South Foreland is high, with irregular chalk cliffs, having on the face of them layers of flint in horizontal lines. On the summit of the Foreland stand two lighthouses, bearing E. b. S. and W. b. N. from each other, 449 yards apart, from which are exhibited two fixed lights, 275 and 372 feet respectively above high water. When in one, bearing W. b. N., they lead a mile to the southward of the Goodwin sands.

CAUTION.—The sub-marine cable, which extends from the South Foreland to Belgium, lies in an E. b. S. direction, with the South Foreland lighthouses in line, bearing W. b. N., until without the stream of the Goodwin sand, passing about a mile to the southward of the South Sand Head light-vessel, after which it takes an E.S.E. direction across to the Flemish banks. It is desirable that vessels should not anchor with this mark or bearing on, lest they damage the electric cable, or lose their anchors.

The sub-marine cable also between the South Foreland and France requires caution, and in order to prevent mischief occurring to it, vessels should not anchor within the distance of 3 or 4 miles from the shore, with the South Foreland high lighthouse bearing between north and N.W., or when beyond that distance, when it bears N.W. b. N., on which bearing it will appear in one with a dark patch on the cliff. Neither should vessels anchor on the southern side of the channel, with the two conspicuous windmills of Coquelles, which stand on the high ground between Calais and the village of Sangatte, bearing between S. b. E. and S.E. b. S.

DOVER STRAIT. — The Channel navigation for large ships is very much straitened in the vicinity of Dungeness by banks composed of coarse sand and broken shells, the principal and most dangerous of which are, the Varne, the Ridge, the Bassurelle, and the Vergoyer, as during equinoctial tides 9 feet water only will be found on the former shoal, nor is there at the same time more than 6 feet on the Ridge, 3¾ fathoms on the Bassurelle, and 12 feet on the Vergoyer. The Varne and Ridge lie exactly in the fair-way of the Strait of Dover, at nearly equal distances from the English and French coasts, and nearly parallel to each other; neither of these banks are continuous, but consist of shoal patches, having deep water between them.

The VARNE, the northernmost shoal is steep-to, and runs in a N.E. b. E. and S.W. b. W. direction, and is about 4½ miles in length between the depths of 7 fathoms at each end; its breadth varying from half to three-quarters of a mile. The shoalest water on it is 9 feet at about a mile from its north-east end, which bears S.S.W. 8¼ miles from the South Foreland, and S. ¾ W. 8 miles from Dover castle; the south-west end bears S.S.W. ½ W., 11¼ miles from Dover castle, and E. b. S. ½ S. 12¾ miles from Dungeness lighthouse. There are strong ripplings over this bank both at springs and neaps, and during tempestuous weather a heavy sea, which would endanger any vessel attempting to cross it, Folkstone church seen between two conspicuous chalk-pits on the face of the distant hills, N.W. b. N., clears the north-east end of the shoal in 7 fathoms, and leads a mile to the north-eastward of the shoal patch of 9 feet, which bears S. b. W. ¼ W., 8½ miles from Dover castle; and the eastern terrace at Sandgate between the above chalk-pits N. ¾ W., or the square tower of Lympne church on with Lympne windmill, clears the south-west end.

RIDGE.—The north-east end of the Ridge (or le Colbart) in 7 fathoms lies about 2 miles to the south-eastward of the body of the Varne, having 16 to 20 fathoms in the channel between them; it then takes a S.W. ¼ W. direction for about 8¼ miles to the same depth, and is about three-quarters of a mile broad. Like the former shoal, it is steep-to, and composed of sand and broken shells, the shoal patches lying in ridges across the stream, which occasion strong eddies even at neap tides. There is much sea on it during a weather tide, and in bad weather it breaks upon the shoalest parts; no vessel should therefore at that time attempt to cross it under any circumstances. The shoalest water of 6 feet lies about 2¾ miles from the south-west end, with the summit of Mount Couple a little open to the southward of Cape Grisnez; S.E. ¾ E., 13¼ miles from Dungeness lighthouse, and W.N.W. ¼ W. 10½ miles from Cape Grisnez. The mark for the north-eastern extreme of the shoal, in 7 fathoms water, which bears N.W. ½ N. 8¾ mile from Cape Grisnez, is, the high trees at the back of Hythe in one with the Swiss-terrace at Sandgate; and Mount Lambert (a very conspicuous hill near Boulogne, with a fort on it) in one with the dome of the new cathedral in the upper town of Boulogne, S.E. ¼ E., or Sandgate Swiss-terrace between the two chalk-pits, N. ½ E., or the revolving light on Cape Grisnez bearing E. ½ S., leads to the southward of the south-western extreme in 9 fathoms.

BASSURELLE.—The body of the Bassurelle shoal bears about W. ¾ N. 18 miles from Cape Alprech, and S. ¾ W. the same distance from Dungeness. It is about 6 miles long in an E.N.E. and W.S.W. direction, and 2 miles broad, and its shoalest parts form a succession of elevated flats, the most considerable of which lie towards the north-east extremity of the bank, and serve as a basis for eight small hillocks of sand, upon the highest of which in 1835, a depth of only 22 feet was found at low water springs. This bank is steep-to and very dangerous to large vessels at low water; during springs there is a strong rippling over it, and in bad weather, during a weather tide, the sea breaks violently upon the highest parts of it. Mount Lambert semaphore just open to the southward of the guardhouse on Cape Alprech E. ½ S., leads to the southward; and Romney church open to the westward of Dungeness lighthouse N. b. E., leads to the westward.

The BULLOCK BANK lies S. ¼ W. 11 miles from Dungeness, with 9 to 10 fathoms water on it, 17 fathoms at half a mile to the northward and southward, and a general depth of 11 to 14 fathoms between it and the south-west end of the Ridge, and Les Ridens. Romney church a little open to the eastward of Dungeness lighthouse, leads over it in 9 fathoms. This bank is also indicated by strong ripplings.

LES RIDENS form a bank composed of a number of patches of sand-stone and gravel, lying S.S.E. ½ E. nearly 16 miles from Dungeness, about S. b. W. 3½ miles from the south-west end of the Ridge, and W.N.W. 12 miles from the Napoléon column at Boulogne. It carries a depth of from 6 to 10 fathoms, and is indicated by strong ripplings over it when the tide runs with any strength,

and by a heavy sea in bad weather. Cape Blancnez well open of Cape Grisnez leads to the northward, and when shut in, leads to the southward of the bank.

The VERGOYER is a sand-bank about 14 miles in length in a N.E. b. E. ½ E. and S.W. b. W. ½ W. direction, and a mile in breadth, lying within 10 and 14 miles of the French coast. The general depth of water on its southern part is from 5 to 7 fathoms, the eastern edge being steep-to, and the western edge of a gradual slope, but near its northern extremity lies a high flat spot about a mile in diameter, with only 12 feet water on it at low springs. From this spot, which lies about 10 miles from the shore, the land may be distinctly seen in clear weather from the hills, at the foot of which stands the town of Etaples, to Cape Grisnez, the lighthouse of which bears about N.E. ¾ E. easterly 19½ miles, and the lighthouse on Cape Alprech, E. ¾ N. 11½ miles. Lydd church in sight to the southward of Dungeness lighthouse, N.N.W., leads to the north-eastward; and Mount Lambert midway between Outreau church and Alprech guardhouse E. ¼ S. to the northward. The ripplings on this shoal at spring tides occasion a high sea during a weather tide, and with a strong breeze from whatever quarter it may blow, the sea breaks with violence upon its northern end, especially from half flood to half ebb.

CAPE GRISNEZ.—It may be necessary here to remark, that an excellent light is exhibited on Cape Grisnez, at 194 feet above high water mark, bearing E. b. S. ¼ S. 51 miles from Beachy Head, S. E. b. E. ½ E. 23 miles from Dungeness, and S. ¼ E. 18 miles from the South Foreland. It revolves every half-minute, and in very clear weather may be seen at the distance of 22 miles. This light, which is eclipsed every half minute, cannot be mistaken for the revolving light of Calais, which lasts four minutes; nor for the Alprech light, which is varied by red flashes.

DOVER has a good tidal harbour, the entrance to which is approached from the S.E. The entrance is narrow, being only 140 feet in breadth, and with gales from the westward, vessels require careful steerage in entering, as the sea breaks across the approach to it at the distance of 300 feet off. The government pier has much improved the entrance, which is still bad in severe weather.

Two red tidal lights are exhibited from a staff on th esouth pier head, of unequal heights, and a small low red light on the north pier head. The small low red light on the north pier, and a similar light on the low outer corner of the south pier, are shown when there are from 7 to 10 feet water on the bar; the two red lights on the Staff on the south pier, and the same low red light on the north pier when above 10 feet, and till the water has fallen again to that level; and the single low red light on each pier when there are from 10 to 7 feet. These lights only point out the position of the piers, and do not indicate the channel. A bright green light is shown all night from the cross wall near the clock-house; and when seen between the piers, leads in the fair-way to and up the harbour. A blue light is exhibited on the end of the government pier to the westward of the harbour, and a bell is sounded in foggy weather.

In the day a red flag is hoisted with a black ball under it, while from 7 to 10 feet water are on the bar; the red flag alone when from 10 to 13 feet; and the ball over it when 13 feet and upwards.

The best time for entering the harbour is about 1½ hours before or 2 hours after high water. The outer harbour carries a depth of 17 feet at high water springs, and from 10 to 13 feet at neaps, and dries an hour before low water, but the depths are quite uncertain, as much depends upon the winds, which at times make a great difference in the flow; in the Pent, and in the Inner harbour, there is only a foot less water, the sills of the gateways being a foot above the level of the outer harbour. A patent slip-way has been constructed in the Pent, with a steam engine, which is used for heaving up vessels for repair.

TIDES.—High water at Dover, full and change, at $11^h\ 12^m$; rise at springs 18½ feet, at neaps 15½ feet; range at neaps 11 feet. On the bar there are 19 feet at high water springs and 12 to 15 feet at neaps.

DOVER BAY is much frequented by coasters bound to the northward with N.E. winds. The usual guide for anchoring is, the South Foreland lighthouses

closed in by the hills, and abreast of the Esplanade, but small steamers anchor close in-shore. The government breakwater now in progress of construction shelters with the wind to the westward of W.S.W., but it causes a strong eddy which sets to the westward, and makes a great deal of swell with westerly winds, but not dangerous, as on those occasions it is a weather tide.

SHAKSPEARE CLIFF is the first chalk cliff to the westward of Dover, and when seen from the eastward presents a conical appearance; but from the southward and westward there is nothing remarkable in its features. This and the other chalk cliffs to the westward of Dover differ from the cliffs to the eastward, by their not having any strata of flints in them, which may be a useful distinguishing mark.

EASTWARE BAY is formed by that part of the coast between Copt point and the railway tunnel through Abbots cliff; and although there is good holding ground, and it is well sheltered on the west by Copt point and ledge, yet it can only be recommended as a temporary anchorage for vessels waiting a tide. The best berth is in about 5 fathoms, abreast of the Coast Guard vessel hauled up on shore under the cliffs, with Folkstone church a little open of Copt point. The shore of the bay is flat and covered with large stones, which makes landing bad at low water. Between this bay and Shakspeare cliff, there is no good anchorage off the coast, as the water is deep and the ground foul.

FOLKSTONE HARBOUR lies W. ¼ S., about 5½ miles from Dover, and is the property of the railway company, and has been cleared out by them for the use of their steamers which ply to Boulogne, but the entrance is awash at low water. There are good beaching places for boats, and berthing room for about 12 brigs, but it is in no way used as a harbour of refuge. In order to prevent the accumulation of a shingle bar, a long horn has been built out from the south pier in a S.S.W. direction, which also shelters the entrance of the harbour from the violence of westerly gales. A red tide-light is exhibited from the lighthouse on the south pier head, when there are 10 feet water and upwards in the harbour; and in the daytime a red flag is hoisted to indicate the same depth. In entering the harbour the pier flag staff in one with the Battery staff on the hill, bearing N.W. b. W. ½ W., clears the Mole-head rocks; and when the church opens between the two pier-heads, the harbour will be open and bearing west.

The anchorage off Folkstone is only used by vessels waiting tide to go into the harbour, and it is by no means good, and very much exposed and limited, there not being room for more than four or five vessels to ride at the same time. The best berth is, with the Pier lighthouse in one with the eastern houses near the north side of the harbour, bearing north, and the church in one with a terrace on the beach west of the clock-house.

TIDES.—At Folkstone it is high water, full and change, at $10^h\ 46^m$; rise at springs 20 feet, at neaps 15½ feet; range of neaps 12 feet 10 inches. There are 17 feet in the harbour at high water springs, and 13 feet at neaps.

SANDGATE ROAD.—The anchorage off Sandgate is much frequented by light vessels bound to the northward, as the western stream is easy, and it affords good shelter with the wind to the northward of E. b. N. They anchor abreast of the Castle, with the Pier clock at Folkstone just clear of Mill point, in from 6 to 8 fathoms, over a bottom of mud and clay, good holding ground.

MILL POINT lies three quarters of a mile to the eastward of Sandgate and between it and Copt point, the first cliff to the eastward of Folkstone, the coast is bordered by a series of rocky ledges extending from 1½ to 3 cables' lengths from the shore. Those off Mill point and Folkstone church cover at 4 feet flood, when they are dangerous to coasters, as it is not easy to estimate the correct distance from the shore; Hythe church open of the stone wall in front of Shorncliff battery, leads to the S.W. Copt ledge extends from off Copt point, and is composed of large sandstone rocks, which dry 6 feet above low water springs. The Mole-head rocks are a continuation to the westward of Copt ledge, and uncover 2 feet above low water springs. The two western Martello towers near Hythe just open of the low part of Mill point, leads to the southward of the Copt ledge and Mole-head rocks.

DUNGENESS.—To the eastward of Fairlight, and between it and Hythe, is an extensive level tract of land called Romney marsh, on the south-eastern point of which stands Dungeness lighthouse, coloured red, which exhibits a bright fixed light at 92 feet above high water, and may be seen in clear weather at 14 miles. The shingle beach at the Ness is low and flat, the highest part being only 4 feet above the level of high water springs; off the pitch of the Ness, near the lighthouse, it is very steep-to, having 15 fathoms close to the beach.

STEPHENSON SHOAL.—W. ½ S., distant 3¼ miles from Dungeness lighthouse, lies the eastern end of a narrow ridge of sand, called Stephenson shoal; it thence extends for nearly three-quarters of a mile in the same direction, and carries a depth of from 19 to 23 feet water, with 4 to 5 fathoms around it. East mill, at Lydd, on with No. 4 coast Guard houses, bearing N.N.E. ½ E. clears the eastern end in 5 fathoms; Rye church on with the New church spire near Rye harbour, N.N.W. ¾ W., clears the western end in 27 feet; Fairlight church and mill in one leads half a mile to the south-west, and the South Foreland and Dungeness lights in one, three-quarters of a mile to the southward.

WEST ROAD.—The West road of Dungeness is that space between the first building to the westward of the lighthouse, and the Black coast guard buildings at Jewrys gap. It affords good shelter against north-easterly winds with the wind as far to the southward as E. b. S., and is much frequented by vessels bound to the northward. The best anchorage, in about 6 fathoms, is with Romney church tower in one with Lydd church, and Dungeness lighthouse E. ¼ S. Smaller vessels may run farther in towards the beach, guarding always against a sudden shift of wind. The western tide runs easy, and affords a good slack for running or working in.

The EAST ROAD affords good shelter to vessels of all classes in from 4 to 12 fathoms, upon pretty good holding ground with the wind between N. b. E. and S.W. The best position for anchoring is, Lydd church just open to the northward of No. 2 battery, and the lighthouse bearing S.W. b. W. ¼ W., in 7 fathoms water.

NEWCOME FLAT.—The Newcome, Swallow and Roar banks lie in the east road of Dungeness; the first is an accumulation of sand contiguous to the beach, which must be carefully avoided when standing in-shore or running for the road. A black buoy, named "Newcome," lies in 16 feet water, with 5 and 6 fathoms close outside of it, at 1½ miles N.E. b. E. from Dungeness lighthouse, and E. b. S. three-quarters of a mile from the first battery to the northward of the Ness.

The SWALLOW BANK lies directly in the anchorage of Dungeness East road, and has a shoal spot of 18 feet on it, which bears about N.E. ½ E., 2¾ miles from Dungeness lighthouse, and S.S.E. ¾ E. 3 miles from Romney church. Lydd church open north of the second battery to the northward of the Ness, leads to the southward in 31 feet water; and Dungeness lighthouse W.S.W., or Beachborough summer-house in one with Hythe church, leads to the eastward.

The ROAR BANK is a narrow ridge of sand running parallel to the coast at 1¼ miles from high water mark. Its south-west end commences abreast of the large opening called Romney Hoy, and from thence it extends 2⅓ miles in a N.E. b. N. direction, and terminates in a depth of 14 feet, about S.S.E., 1¼ miles from Dymchurch. It carries a depth of from 9 to 12 feet water, with 2 to 3 fathoms between it and the shore. A vessel should not approach it within 6 fathoms water.

HYTHE FLAT is the shallow extending from the shore between Dymchurch and Shorncliff battery. The least water on it is 22 feet; and its outer edge in 5 fathoms abreast of the Martello tower, is about 2 miles from the shore. In standing in-shore towards the flat, a large ship should go about when the South Foreland high lighthouse is shut in by Shakspeare cliff.

RYE HARBOUR is chiefly used by coasters and a few small fishing vessels; and being very difficult of access, the services of a pilot are almost rendered indispensable. The entrance near low water mark is near the Black Fish houses which stand at the eastern end of the sand hills, with Rye church between the

pilots' houses and the high Martello tower at the point. In entering look out for the black buoys, which are placed on the low water western edge of the channel, and having left them on the port hand and the red and white buoy on the starboard hand, steer to pass to the S.W. of the Beacon or Dolphin, at the end of the low stonework which is covered at high water. From thence the two tide lights in one will lead straight up to the eastward of the pilots' houses on the point, leaving all the Broom beacons on the low stone work to starboard, and the Triangular beacon and the beach to port. When as far up as the pilots' houses a vessel should either anchor, or make fast alongside one of the five berthing places on the eastern shore.

HARBOUR LIGHTS.—Two lights are exhibited near the Camber at the north side of the entrance, during the time there are 10 feet water and upwards on the bar. When in one they bear N. b. W. and S. b. E. from each other, 180 yards apart, and lead over the sand in front of the harbour, which is 3 feet higher than the channel. They are, therefore, only available for leading up by the side of low stonework.

On the shingle beach to the westward of the Martello tower two Thwart lights are shown, from the time the tide begins to flow in until there is only water on the ebb for a boat to go out, but they are only visible from the south-eastward, and are kept in position by the pilots who arrange them so as they will lead through the channel up to the Dolphin, when the harbour lights will be in one.

In entering at night a vessel should keep along shore by the coast guard near the sand hills, and immediately the Thwart lights are in one, steer for them till the harbour lights are in one, which will lead in.

TIDES.—It is high water, full and change, at the point, town, and Scot's float sluice, at $10^h\ 55^m$, and the springs rise in Rye bay 22 feet, at the point 16 feet, at the town 12½ feet, and at the float sluice 11½ feet; the depth in the harbour at high water springs is 15 and 16 feet, at neaps 10 and 11 feet. The flood runs into the harbour round the beach with a velocity of 6 knots, but its rate lessens inside. It would not be prudent to leave the harbour during the strength of the tide, but wait till it slackens, about half an hour before high water.

In the day time the tide signals at the point are as follows: A red flag is hoisted while there are 10 feet on the bar; an additional small red flag on a shorter staff, half-mast high, show 13, and hoisted up, 14 feet; two small red flags, half-mast high, show 15, and hoisted up, 16 feet. At high water a blue flag is hoisted at the yard-arm, and the above signals are kept in the same order until 8 feet on the ebb.

HASTINGS lies immediately to the westward of the sandstone cliffs, the greater part of the town built in the valley between East hill, or Rock-a-nor point, and West hill, on which stand the ruins of an old castle, and three conspicuous windmills. St. Leonards is the continuation of the town of Hastings in a westerly direction, and consists of well-built terraces. Along the coast several rocky ledges extend some distance from the shore, and are dangerous to vessels when covered; the brow of the high land some distance to the northward of Beachy head (Firle beacon hill) on with or a little to the southward of Galley hill Martello tower leads to the southward. The shore being flat and rocky, it makes a bad beaching place for boats; the best, however, is abreast of the Fish-market, near the eastern part of Hastings; and for the safety and accommodation of the fishermen, and for their guidance in running on shore, two fixed lights have been established on a N.N.E. and S.S.W. bearing, 169 yards apart. The upper light, bright, is exhibited from the side of West hill over the houses in the town; and the lower light, red, from an octagonal building near the Fish-market on the beach. The anchorage off the town is only used by vessels having to discharge a cargo on the beach, or to wait a tide, it being too open for safety; for with the wind to the southward of west, a heavy sea rolls in on the coast. They usually bring up with Fairlight high coast guard house well open of the cliff.

FAIRLIGHT DOWN is the highest land on the coast, and often the first landfall made by homeward-bound vessels. It may always be known by two con-

spicuous objects on it, viz., the high mill, 626 feet, and the church (which has a square stone tower and staircase) 597 feet above high water. The summit of the Down is green pasture land, and the face of the cliff a grey sandstone.

BOULDER BANK.—The shoals which lie abreast of the Martello towers between Rye and Fairlight are called the Boulder bank and Tower knoll. The shoalest part of the Tower knoll has only 6 feet over it, and lies in line with the third tower, No. 36, to the eastward of Hook point, and Dogs Hill mill, which is black, and stands to the westward of the thick wood at Winchelsea. The Boulder bank is a ridge of sand with several rough banks of coarse gravel and stones on it, lying about 1¼ miles off the coast abreast of the eastern side of Fairlight hills. Bexhill just open of St. Leonards, or St Leonards well open of the East cliff at Hastings, leads to the southward; and Playden steeple in one with the turret of Rye church, leads well to the eastward. When Fairlight church bears north, a ship of 19 feet draught may stand over the long sand ridge, which is a continuation of the Boulder bank to the south-eastward, and tack in-shore abreast of Fairlight cliffs in any convenient depth of water.

BEXHILL stands on the first rising ground to the westward of St. Leonards, and is very conspicuous from the sea, having a church with a low tower on the summit amongst the trees, and to the westward of it a remarkable high white house.

Off Galley hill, which is the nearest cliff to the eastward of Bexhill, and the second to the westward of St. Leonards, are several rocks rising 2 or 3 feet above water; and a little to the westward of these at a third of a mile from the shore, between the bearings of S. b. E. and S.S.W. from Bexhill church, are several rocks awash, called Bexhill reef, having a depth of 6 feet water between them and the shore; Fairlight high mill over the west end of St. Leonards, clears them to the southward in 7 feet at low water. To the westward of Galley hill, off Nos. 4, 5, and 6 Towers, at a third of a mile from the shore, a reef dries in several spots at low ebbs, named the Oyster reef; this, as well as Bexhill reef, may be avoided, by not going to thenorthward of the line of Willingdon chalk-pit on with the first tower to the eastward of the Walls end houses. No good anchorage will be found between Galley hill and the sluice houses, as the ground is foul, and several rocky patches, called the Coxheath shoals, having 8 to 12 feet water over them, lie half a mile outside the Oyster reef, and a short mile to the southward of the 5th tower (No. 50) west of Galley hill. Willingdon chalk-pit on with the second tower to the westward of Walls end houses, or Fairlight mill over the west end of St. Leonards, leads to the southward of all the foul ground between Bexhill and the sluice houses.

PEVENSEY BAY lies between Langley point and Walls end houses, and affords good anchorage for small vessels, over a bottom of sand and mud, with the wind to the northward of W.S.W. They should bring up abreast of the third tower to the northward of Langley point, with Beachy Head house just open of Langley point, or Pevensey church or castle bearing N. b. E.

EASTBOURNE BAY affords good shelter with the wind to the northward of west or N.E. b. E., in 3½ fathoms over a sandy bottom, abreast of the Grand Redoubt, with Willingdon church spire open west of the Redoubt, and the Towers which stand to the northward of Langley point just opening to the eastward.

HOLYWELL BANK.—A bank which dries a foot above low water springs, and composed of large loose rocks, lies a quarter of a mile off Wish tower, which stands on the sandstone cliff to the south-east of Eastbourne. The long mark for it is, the square tower of Westham church in one with the eastern edge of the Grand Redoubt; but a vessel to tack clear of it must have the church halfway between the Redoubt and the first tower to the eastward. A ridge of sand runs from this bank in a S.W. ½ W. direction, nearly parallel with the coast, and terminates to the south-east in a flat carrying a depth of 12 and 13 feet water, at half a mile to the eastward of Beachy Head ledge. It is called the Holywell bank, and carries a depth of 8 to 12 feet, with 14 to 17 feet between it and the shore, in a narrow gut named Whitbread Hole. Westham church just

open to the eastward of the Grand Redoubt, leads to the eastward of the Holywell; and the little spire of Herstmonceux church in one with the western part of Westham church, or Hankham mill on the battery houses on Langley point, leads between it and the Royal Sovereign shoals.

HOLYWELL LEDGE is a ridge of high sandstone rocks commencing abreast of the chalk cliff to the south-west of Wish tower, and terminating a little below the lime quarries. A large sandy flat extends along shore between it and the cliffs, on which vessels that load with lime ground to take in their cargo, and are protected by the ledge from the break of the sea.

BEACHY HEAD.—The promontory of Beachy Head is rendered strikingly remarkable when seen from the westward by the uniform convexity in the profile of its seven white cliffs; and when seen from 15 miles in an E.S.E. direction, it makes like an island, the left side being chalk cliffs, with a house on it, and the middle and right side covered with verdure, terminating in the bluff of the South Downs. There is an excellent revolving light on a spot called Belletoute, near the summit of the second cliff to the westward of the Head. The light is 285 feet above high water, and its intervals of brilliancy are 2 minutes, the flash remaining visible for 15 seconds.

From Beachy Head towards Pevensey the coast trends deeply inwards, and the land here is very little above the level of the sea; towards Hastings it again becomes elevated, and the land appears (as it is commonly called) double, rising very high in the interior. The mill on Fairlight down is 600 feet above the sea, and the church is nearly the same height, and stands to the eastward of it. Between the Head and Fairlight the strand, on which are a great number of Martello towers, is composed of coarse shingle, studded here and there with small rocky heads, particularly in the vicinity of Hastings and Cliffs-end point.

The Royal Sovereign shoals are a number of rocky banks which lie directly in the track of vessels proceeding between Beachy Head and Dungeness. The principal names to them are, the Royal Sovereign, Horse of Willingdon, Elphick Tree, Rattan shoal, Kinsman Nab, Long shoal, and Southern head.

The ROYAL SOVEREIGN is composed of sandstone rocks, and has only 10 feet water on its shoalest part. It lies E.S.E. $\frac{1}{4}$ E. $6\frac{7}{10}$ miles from the signal house on Beachy Head, and the marks for the shoalest part are, the first tower standing to the eastward of the Grand Redoubt at Eastbourne in one with the western edge of Willingdon chalk-pit, and Fairlight mill just opening of Hastings castle cliff. A nun buoy of large dimensions, painted black, and surmounted by a staff and ball, is moored half a cable's length to the southward of the 10-feet patch, with the following marks: the first Martello tower to the eastward of Eastbourne in one with the west side of Willingdon chalk-pit N.W. b. N.; the White mill north of Bexhill a little open to the westward of the third Martello tower west of Bexhill cliff N.E. b. N.; Fairlight mill just open to the southward of Hastings castle cliff N.E. b. E. $\frac{1}{2}$ E., and Beachy Head N.W. b. W. $\frac{1}{2}$ W. At 3 cables' lengths to the southward of the buoy a vessel of moderate draught may pass up or down channel in safety.

The HORSE OF WILLINGDON consists of stone and rock, and lies N.W. b. W. 2 miles from the Royal Sovereign buoy. The marks for the shoalest part, 18 feet water, are, Hankham mill just seen to the westward of the third tower from Langley fort, or the seventh tower from Eastbourne, and Beachy Head signal house, W.N.W. $\frac{1}{2}$ W. $4\frac{3}{4}$ miles. There are strong ripplings over this shoal.

The ELPHICK TREE is a small shoal patch of 30 feet, lying about three-quarters of a mile to the north-west of the shoalest part of the Horse of Willingdon; and between it and the shore lies a small rocky spot with 4 fathoms on it, called the Rattan shoal, at about $1\frac{1}{2}$ miles from Langley fort, which is in one with Hankham mill, and the three mills at Eastbourne just open to the southward of the coast guard staff near the Redoubt.

The LONG SHOAL is a narrow bank, about a mile in length in a W. b. S. direction, which lies half a mile to the northward of the Royal Sovereign, and carries a depth of from 18 to 25 feet water over it. A smaller patch nearly joins its western edge called Kinsman Nab, with only 22 feet over it: the marks for

it are, Willingdon chalk-pit on with the first tower, and Hankham mill just open to the eastward of the eighth tower to the eastward of Eastbourne.

The SOUTHERN HEAD is a small narrow ridge, about a third of a mile in length in a N.N.E. and S.S.W. direction, lying S. ½ W. a mile from the Royal Sovereign, with only 25 feet water over it. The marks for the shoalest part are, Beachy Head signal house N.W. b. W. ¼ W. 7 miles, and Hankham mill in one with the eighth tower to the eastward of Eastbourne, or fourth from Langley fort. Close to the southern edge of this shoal there are 8 fathoms water, to the eastward 11 fathoms, and between it and the Royal Sovereign 5 to 10 fathoms; a depth of 10 fathoms will be found half a mile to the southward of it, and at a mile in the same direction Beachy Head light opens out, bearing N.W. ¼ W. which at night leads to the southward of all the shoals.

DIRECTIONS.—The ground between Dungeness and Beachy Head is, generally speaking, shoal as well as flat; nevertheless the depths from the offing towards the shore decrease so regularly, that the land to the westward of Dungeness may be made with safety in the thickest weather by the lead.

In coming from the westward, Seaford cliff kept in sight to the southward of the pitch of Beachy Head, will lead at least 2 miles to the southward of the Southern Head; and when the two high white mills at Battle are in one with the town of Bexhill bearing about N.N.E., a vessel will be to the eastward of the Royal Sovereign shoals, and may shape her course about E. ¼ N. for Dungeness. Fairlight mill on with Hastings east cliff will also lead a quarter of a mile to the eastward of the Southern head, and to the eastward of all the shoals, which are very perceptible during spring tides, and in bad weather the sea breaks heavily upon them.

From Hastings a vessel may pass to the northward of the Royal Sovereign shoals by keeping Fairlight mill on with the east end of St. Leonards near St. Leonards gate; but if bound westward from off Dungeness, she should not steer to the westward of W. ¼ S. before Beachy Head lighthouse or Seaford cliff opens out.

Small vessels should not approach too near Beachy Head when rounding it, in order to avoid the Head ledge, which is a narrow ridge of sandstone, extending from the S.E. pitch of the Head, and bearing from the signal house S. b. W. half a mile. In rounding from the westward, keep the light-house well open to the southward of the Head; and in rounding from the eastward, the Sea houses at Eastbourne open to the eastward of Wish Tower cliff; but in bad weather an offing should be kept of 2 miles outside the strong ripplings and heavy broken sea, which extends about 1½ mile from the shore, and which is caused by a narrow ridge of rocks, running out S.S.W. from the signal house carrying a depth of less than 10 fathoms water, with 13 fathoms to the westward, and a hole with 17 fathoms in it to the eastward of them.

At **NIGHT,** vessels coming from the eastward will open Beachy Head light to the southward of Beachy Head cliffs, when it bears N.W. ¼ W.; and whether bound up or down Channel, when to the eastward of Beachy Head, and within 9 miles of it, by keeping the light open they will pass about a mile to the southward of all the Royal Sovereign shoals.

TIDES.—As the tidal wave flows to the eastward or up the channel, and the stream on the south-east coast of England turns at high water at Hastings, whilst at Dungeness and from thence to the North Foreland, the eastern stream runs until 4 hours after high water at that place; it will readily be seen what a long flood a vessel will carry when running up channel. It therefore becomes necessary to study the set and turning of the stream, in order to keep a correct reckoning, on account of the peculiarity of the tides to the eastward of Fairlight.

Accidents of a fatal nature have occurred to ships running up channel by being lost on the coast of France, in the vicinity of Boulogne, which has been attributed to the rotary action of the stream, but there is more reason to believe that they have been set to the eastward by the long continuance of the eastern stream, and deeming themselves to the westward of Dungeness have been steering east, whilst they have been 10 miles beyond it, when probably the stream to the S.W. has

began to run, and catching them on the port bow, has set them over on the coast of France. Besides a careful watch being set on the stream, when running in thick weather from the Isle of Wight to Dover, a strict attention should also be paid to the lead.

Off the coast of Sussex, from Littlehampton to Seaford, the stream turns one hour before high and low water by the shore.

Between Beachy Head and Cape Grisnez the rise, velocity, and duration of the tides, on both sides of the channel, are materially affected by local circumstances, as well as by that rotary disposition which is so remarkable farther to the westward, though here the near approach of the opposite coasts prevents its being so regular and complete.

It is high water by the ground at Beachy Head at $11^h\ 0^m$ at full and change, and also at Dieppe. The stream in the offing begins to run to the eastward at low water, and continues to do so until high water, a similar law applying to the western stream.

Upon the Varne and Ridge it is high water on full and change days at $10^h\ 40^m$; but the north-eastern stream does not commence there until $4\frac{1}{2}$ hours flood, nor the western stream till $4\frac{3}{4}$ hours ebb; making $6\frac{1}{4}$ hours of north-eastern and $5\frac{1}{2}$ hours south-western tide.

Strong gales from the westward will prolong the north-eastern stream nearly an hour, and retard proportionably that to the south-westward; so that on some occasions, on the Ridge especially, 8 hours north-eastern tide, and only 4 hours to the south-westward, have been found.

Between the Vergoyer and the French shore the tide makes on an average one hour sooner than it does in the offing, both on the ebb and flood.

At Eastbourne it is high water at full and change at $11^h\ 30^m$; springs rise 21 feet 3 inches, neaps 17 feet. At the Royal Sovereign Shoals and off Hastings, it is slack water at the time of high water at Hastings. At Hastings it is high water at full and change at $10^h\ 53^m$, rise at springs 24 feet, neaps 17 feet 6 inches; Dungeness at $10^h\ 45^m$, rise at springs 21 feet 9 inches, neaps 19 feet; Boulogne at $11^h\ 25^m$, rise at springs 25 feet, neaps 19 feet; Folkstone harbour at $10^h\ 46^m$, rise at springs 20 feet, neaps $15\frac{1}{2}$ feet; Dover at $11^h\ 12^m$, rise at springs $18\frac{1}{2}$ feet, neaps $15\frac{1}{2}$ feet; Deal at $11^h\ 5^m$, rise at springs 17 feet, neaps 10 feet; and at Ramsgate at $11^h\ 40^m$, rise at springs $15\frac{1}{2}$ feet, neaps 12 feet.

About one mile S.S.E. of the South Foreland lighthouse, the stream begins to set to the eastward about $1^h\ 30^m$ before high water on the shore at Dover, and runs from N.E. b. E. to E.N.E. about $5\frac{1}{2}$ hours, or till 4 hours after high water; it then turns and sets W.S.W. $\frac{1}{4}$ W. about 7 hours. At Dover the flowing stream very seldom continues more than 5 hours, and sometimes scarcely so much; it is nearly the same at Ramsgate. To the northward of the South Foreland the streams change their direction to N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S.

In the Downs the north-eastern stream begins about $1^h\ 20^m$ before high water at Dover, and continues to run $5^h\ 30^m$; it then turns and runs in a contrary direction till 2 hours before the ensuing high water.

In the Gull Stream, 1 mile N.N.W. from the Bunt Head, the northern stream begins about $1^h\ 10^m$ before high water at Dover, and continues for 6 hours; it then turns and runs in a contrary direction till $1\frac{1}{2}$ hours before the ensuing high water. Its direction is N.E. $\frac{3}{4}$ N.; but the last hour changes to E.N.E. and even to the southward of east; the last hour of the southern stream changes from S.W. $\frac{3}{4}$ S. to W.S.W., and even to the northward of west.

The following are Captain Bullock's remarks on the set of the tides:—

"As there is a peculiarity in the duration of the flood and ebb the whole length of the coast from the North Foreland to Hastings, so there is a great peculiarity in the times of the turning of the stream, the knowledge of which is most essential to the navigation of this part of the channel. Thus, between the North Foreland and 8 miles to the westward of Dungeness the stream commences setting to the eastward about 2 hours before high water at Dover, and runs to the north-eastward, taking the form of the channel, until 4 hours after high water. The western stream begins about $4\frac{1}{4}$ hours after high water at Dover, and runs until

2 hours before the following high water. This is a general rule for the Strait of Dover; a slight difference, however, takes place in the turning of the stream close in-shore, which may sometimes be taken advantage of in turning to windward. Thus it will be seen that the stream from the North Sea, which fills the Thames, runs down channel until it is met and overcome by the stream from the westward, which meeting takes place off Fairlight at about 2 hours before high water, when it begins to turn and set to the eastward, the greatest velocity being about an hour after high water, and that of the western stream about half an hour after low water, which is 7 hours after the time of high water by the Tables.

"Off Fairlight, on account of the meeting of the North Sea and channel streams, the tides are sometimes very confused, and have not much strength; farther to the westward, off Hastings, they run more regularly, but with little force. At 6 miles off Bexhill, the stream runs regularly during the whole tide, the flood setting E. b. N., which is a slight inset to Rye bay, and the ebb in the contrary direction.

"From Dover to Hastings the duration of the flood is always considerably less than the falling tide, the former flowing $5^h\ 15^m$, and the latter ebbing $7^h\ 3^m$; but to the westward of Hastings, at Eastbourne, the duration of the two tides begins to equalize, the tide flowing $5^h\ 45^m$, and ebbing $6^h\ 40^m$.

"In-shore, between Hythe and Dungeness, there will be found a slack during the strength of the eastern stream; also from Hastings to Beachy Head the flood runs easy. During the western stream the tide is easy between Hythe and Sandgate as far as Mill point; and between Dungeness and Fairlight there is a slack which might be taken advantage of. Between Pevensey bay and the Holywell bank the western stream commences at half an hour before high water; and over the bank, and in Whitbread hole, there is a strong eddy setting down after half flood. For several miles off Beachy Head the tides turn with the high and low water by the shore.

"From what has been stated with reference to the stream near Dungeness, and about 8 miles to the westward of it, it will be seen that, if a vessel carries the eastern stream or flood as far as Fairlight, she will have a continuation of easterly tide for 4 hours longer, and if sailing 8 knots, she will carry it to the North Foreland. If turning to windward, and she can get to the eastward of Fairlight by high water, she may then advance as far as the West road at Dungeness before the tide makes to leeward; but if not to windward of Fairlight by an hour after high water, she will get no farther, and may either keep underway, or anchor for the tide, as convenient."

SECTION V.

BEACHY HEAD TO SELSEA BILL.

VARIATION 21¾° WEST.

NEWHAVEN lies nearly 8 miles from Beachy Head, and is considered the best harbour between the Downs and Isle of Wight. This harbour lies to the eastward of Burrow head, or the last of the range of chalk cliffs to the eastward of Brighton, and at the north-western extremity of Seaford bay. It is formed at the entrance by conducting the channel of the river Ouse into the sea in a southerly direction from the town of Newhaven, which stands on its western bank, nearly a mile above the pier heads. Here there is an opening bridge to allow vessels to pass through when bound to Lewes, the river being navigable to that place for small coal brigs. At the town above the bridge is a ship yard for building and repairing ships.

The piers are constructed of strong wood piles 150 feet apart. The inner end of the eastern pier (which is about 500 feet long) is in a line with the high ridge of beach above high water mark; beyond this on the western side a very well-built stone embankment forms a continuation of the western pier terminating at the sea wall near the watch-house opposite the railway hotel. Near the hotel there is a good wharf, the property of the railway company, from whence steamers run to Dieppe and Jersey. On the western shore, from the watch-house to the bridge, there are 20 sets of berthing piles, where vessels lie alongside and ground on soft mud.

A high groyne or breakwater which runs out in a S.W. b. S. direction, has been constructed at a short distance to the westward of the piers, to accumulate the shingle and prevent the shifting bar from forming which before was so detrimental to the harbour. The only bar now existing is one of compact shingle or pudding-stone, which extends across the entrance at 250 feet outside the piers. Over the bar there are about 6 inches at low water springs, whilst between the piers there are 2 feet, and from thence to the town the depths vary from 1 to 4 feet.

The depths over the bar are always a few inches more than the actual rise of tide; they are indicated by the signals made from the flagstaff on the western pier by day, and the lighthouses by night, but it is necessary to allow for the heave of the sea.

The day signals are made from the flagstaff on the western pier. For 8 feet to 10 feet water over the bar one Ball is hoisted; 10 to 13 feet, two Balls. At 13 feet the Balls are lowered and a Red flag is hoisted and kept up until the tide has ebbed to 13 feet; from 13 to 10 feet two Balls are hoisted, and from 10 to 8 feet one Ball.

Two fixed lights are shown from the western pier at 28 and 17 feet respectively above high water and when in one bear N. ¼ W. and S. ¼ E. about 50 yards apart. The high light is shown all night; the low light shows red when there between 10 and 13 feet on the bar, and bright above 13 feet till it comes again to that level; from 13 to 10 feet water it again shows red.

DIRECTIONS.—When coming from Beachy head to Newhaven, observe the rocks off Crowlink (on the seven cliffs), and if they are awash or covered, it will indicate a depth of 10 feet water and upwards over the bar. Run towards Burrow head, and when nearing the piers bring them to bear north with the harbour open, and steer direct in, passing to the westward of the red buoy outside; from

thence a N. ½ E. course leads up to the harbour. When far enough up anchor, or row a warp to the berthing piles or stage, and drop into a berth.

At night observe the depths by the lights, and run in with them in one, bearing N. ¼ W., and proceed as before.

On the strength of the ebb, the harbour is by no means easy of access, and formerly the signals were never shown on the ebb, but since steamers have used the harbour it has been deemed necessary to have signals as long as there is water enough for them.

TIDES.—At Newhaven it is high water, full and change, at $11_h\ 51^m$; rise at springs 20 feet, at neaps 15¼ feet; neaps range 10¼ feet. About 1½ hours before high water, the stream begins to set to the westward close to the shore, but it is so weak across the harbour entrance that it is of no consequence excepting to a sailing vessel with a light wind. Between the piers the stream (being contracted) runs with great velocity on both tides, diminishing in force as the harbour widens.

SEAFORD ROAD.—Between Shoreham and Beachy Head the depths very gradually decrease from the offing towards the land, and vessels may anchor all along the coast with off-shore winds in from 2 to 9 fathoms water; but the anchorage of most general resort is that in Seaford road, which lies between the tide mill which stands to the eastward of Newhaven and the Martello tower near the beach at Seaford. The best anchorage in the road is between the tower and Blatchington battery, with Beachy Head lighthouse just shut in by the cliffs, over a bottom of sand, shells, and mud. At this anchorage Beachy Head cliffs will afford shelter with the wind as far southerly as E.S.E., and it is therefore superior to the western bay of Dungeness. Seaford head is often mistaken for Beachy head by vessels coming up Channel within 4 or 5 miles of the land; they may however be distinguished by there being a small building on the highest part of Beachy head, whereas there is nothing on the former but a conspicuous large green patch on the face of it.

The HENSTON ROCKS are some straggling chalk rocks, with 2 to 4 feet water on them, lying 2½ cables' lengths off the low north-west end of Seaford head. The marks for them are Blatchington spire and mill just open to the eastward of the Martello tower on Seaford beach. Newhaven mill on with the pier heads, or Crowlink coast guard (on the seven cliffs) open of the S.E. cliff of Seaford head leads to the southward in 3½ fathoms.

APPEARANCE OF THE COAST.—The coast from Newhaven to Seaford head is composed of low beach, on the western part of which stands a very large yellow building called Catt's tide mill; near the eastern part is the village of Seaford, conspicuous by its square tower church, and the spire of Blatchington church which stands a little further inland, also the Martello tower on the beach near the low N.W. point of Seaford head. The land at the back of Seaford and Newhaven is high, it being a continuation of the range of hills from Beachy head, known as the South Downs. Seaford head is 270 feet high, and is generally of a rusty white appearance, having a large green patch on the face of it near the top, by which it may be known from Beachy head, which has always a clean white face and is surmounted by a house. To the south-east of Seaford head is the valley of Cuckmere, through which a small stream runs called Cuckmere haven, and between this and Beachy head is a range of undulating cliffs (the seven cliffs) which are distinctive features in the appearance of Beachy head when seen from the westward.

From Brighton to Newhaven the coast is composed of chalk cliffs, varying in height from 30 to 170 feet, the summits of which are clothed with verdure. The village of Rottingdean lies in one of the valleys about 1¾ miles S.E. by E. of the eastern part of Brighton, and on the western side of the downs adjoining Rottingdean stands a large black mill, which is very conspicuous at sea. Burrow head (the eastern cliff on this range) is about 190 feet high, with a flagstaff upon it; the upper portion of the head is composed of earth and the lower part chalk, but the wash from the earthy part gives the face of it a rusty appearance. Close to the eastward of Burrow head is the harbour of Newhaven.

The coast about Shoreham is low, showing a deep valley of the river Adur,

between Shoreham and Lancing, but Lancing circular grove, Lancing white mill, the town of Shoreham, the high coke chimney near Shoreham harbour, Copperas and Portslade mills, and the town of Brighton are all objects easily recognized.

At 5 miles to the N.N.E. of Worthing is Chanctonberry ring, a large circular thick grove of trees 964 feet above the sea, and is frequently the first object seen on making the land. A reference to this object would often assist the mariner when all other objects are too low or indistinct to be observed.

The coast from Bognor to Worthing is very low, not being much above the high water level of the sea. The principal objects are the large white mill at Felpham, Middleton church spire, Climping large black mill, the harbour mill and Beach town at Littlehampton, Preston church spire showing above the trees, Highdown hill, on the face of which are three chalk pits and a black mill on its western slope, Goring church, (spire black), Salvington mill (on the hills in the back land), and Cisebury hill to the northward of the town of Worthing, which, with its fine buildings and church tower, standing close to the beach, form conspicuous objects at sea.

The principal dangers between the Owers and Beachy head are, the Bognor, the Shelly, the Winter, and the Jenny Ground rocks, which are close to the shore, and the Kingmere rocks, which lie about 4½ miles from the coast between Littlehampton and Worthing.

BLACK ROCK LEDGE lies off the eastern part of the town of Brighton, abreast of the coast guard station (called Black rock), at 2½ cables' lengths from the cliffs at low water springs. The ground is shoal for 2½ cables' outside the ledge, which must be approached with caution when the tide is low. Beachy head lighthouse open of Seaford cliff clears the shallows in 3 fathoms, and when the tide flows over the ledge it is difficult to estimate the distance off shore; but the pier end shut on with the western houses in Brighton will clear the dry part of the ledge, about a cable's length.

The whole of the coast between Brighton and Newhaven is studded with chalk rocks in detached patches on a sandy strand, but the depths alongshore are regular. Beachy head light just shut in by Seaford head clears all the rocks in depths varying from 8 to 14 feet, and if kept a quarter of point open it makes a good working mark; the best guide, however, is the lead.

The PRICKER ROCKS are a few high rocks (dry 10 feet) detached from the low water mark off Burrow head; they lie nearly 2 cables' lengths off the cliffs, and afford shelter to Newhaven harbour, from which they are distant 2½ cables' lengths. These and the shallows off Newhaven harbour are cleared in 16 feet by keeping Blatchington church spire (over the low cliffs) between the Buckle inn and the long row of white coast guard buildings near the battery bearing E.S.E.

At Brighton it is high water at full and change at $11^h\ 15^m$; springs rise 19¾ feet, neaps 15 feet 4 inches; neaps range 12½ feet. A green fixed light is exhibited from the chain pier head at 35 feet above high water.

ANCHORAGE OFF SHOREHAM.—A vessel may anchor in any convenient depth off the harbour from a third of a mile in 16 feet to 1 mile in 24 feet water, over sand and gravel with patches of chalk; or to the westward of the Jenny ground rocks, with Shoreham church and Lancing grove in one, in 3 fathoms, sand, shells and mud. Should it be necessary to wait any length of time for sufficient depth of water to go into the harbour, she should anchor off the black coast guard buildings, with Shoreham church bearing north, and Portslade mill between the low lighthouse and the pier heads, in 3½ fathoms. This anchorage is sheltered from westerly winds by the shallows off Worthing, and has the advantage of having a very easy stream on the flood.

SHOREHAM HARBOUR is formed by the outset of the river Adur through the beach, the stream being conducted outwards by a middle pier between the two piers which form the entrance and which are 190 feet apart. The middle pier divides the harbour into two parts called the eastern and western arms. The western arm is the natural one formed by the course of the river. The eastern arm is partly artificial and partly formed by the original course of the

river, which then emptied itself into the sea a mile to the eastward of the present entrance.

In the western arm there are good wharves, the property of the railway company, which are chiefly used by colliers and timber laden ships; the channel near the wharves has been much deepened, so that vessels lie longer afloat than formerly. The bed of the river between the wharves and the town is uneven and hard; at the town the bed is 5 feet above the level of low water springs at the piers. At the Custom-house quay there are 11½ feet at high water springs.

In the eastern arm there is a long canal in course of construction for the accommodation of colliers, and the whole channel from the piers to the canal is undergoing excavation by steam dredging. Two fixed lights are shown opposite the entrance of the harbour at 42 and 23 feet respectively above high water, and when in one bear N.N.E. ½ E. and S.S.W. ½ W., 250 yards apart. The high lighthouse is of grey stone, and exhibits a bright light from sunset to sunrise, and is visible at 8 miles. The low lighthouse, which is built of wood painted white, stands near the apex of the middle pier, and also exhibits a bright light during the time there are 11 feet water and upwards in the harbour, or when it is deemed prudent for a vessel to run for the harbour, but a red shade is put over it when it is high water and slack tide.

Near the low lighthouse is a flagstaff on which a red flag is hoisted during the day when there are 11 feet and upwards in the harbour, and at high water slack a blue and white pendant is substituted for it. There is also a code of 36 signals, made with balls and a pendant from the staff at the low lighthouse to pilots in the offing; a book of which is supplied to all vessels frequenting the port by the harbour master.

DIRECTIONS.—Keep the harbour entrance open with the two lights in one bearing N.N.E. ½ E., and when inside the pier heads borrow on whichever side or arm the vessel is bound to, to avoid being set by the stream against the middle pier, where some serious accidents have occurred. In the western arm, abreast of the wharves, are moored buoys on the top edge of a steep bank, and it is customary to run a warp to these buoys, or run the vessel's forefoot on the bank, or drop the anchor and let the flood stream swing her stern round, and then warp into a berth.

TIDES.—It is high water, full and change, at Shoreham at $11^h\ 34^m$; rise at springs 17 ft. 10 in., at neaps 13 ft. 3 in. The stream on both tides runs with great force between the piers, often as much as 6 knots; on the flood it is split by the middle pier, and its force diminished in each arm. The horn or breakwater, which is built in a S.W. direction, near the western side of the harbour, has a good tendency to arrest the progress of the shingle beach, and prevent a bar from forming at the harbour entrance, which was continually occurring before the horn was constructed.

The JENNY GROUND is composed of a cluster of chalk rocks carrying a depth of from 5 to 7 feet at low water, and extending half a mile from the shore abreast of Copperas (white square) mill, which stands on the low cliffs near the eastern arm of Shoreham harbour. The marks for the outer part of 7 feet are, Copperas and Portslade (white square) mill in one, N.N.E., and Shoreham church shut over the piers. Shoreham church on with Lancing grove and open south of the white pier-heads N.W., or the church spire in the eastern part of Brighton shut on with the chain pier or the second set of piles from the end E. b. N. ¾ N. leads to the southward.

The CHURCH ROCKS lie half a mile to the westward of the black coast guard buildings off Shoreham, or two-thirds of the way from them towards the groynes on the beach, and one-third of a mile off shore; they have only 3 feet water on them, but they have been seen dry by some of the inhabitants of Shoreham. The marks for the rocks are, the cement chimney on with the roof of Shoreham church, and Lancing mill over the two easternmost groynes on the beach. Fishers-gate mill (circular and grey) just open of Shoreham harbour piers, bearing E. ½ S., leads to the southward in 14 feet water.

The GRASS BANKS, which extend along the coast off Worthing, have as

little as 9 feet over them at 1½ mile from the shore, and are so named from the great quantity of long grass that grows on the chalk and gravelly soil of which the bottom is composed. Their most projecting part, called the Elbow, bears S.S.E. from Navarino mills and S.S.W. from Lancing grove, and they terminate on the eastern side about a mile to the westward of the black coast guard buildings off Shoreham.

When sailing alongshore from the eastward, keep the lead going, and a look out for Portslade mill coming on with Shoreham piers, which clears the Elbow; observing that when Lancing grove is in one with the coast guard houses bearing N.N.E., a course more to the northward may be kept, but when working the lead is by far the best guide.

The KINGMERE ROCKS lie 4½ miles off shore, S.S.W. from Highdown and Preston church, and have 28 to 30 feet water over them. They are 2 miles in length in a N.W. b. W. and S.E. b. E. direction, and very narrow; between them and the flats which extend off the shore there is a general depth of 5½ and 6 fathoms. Chanctonberry grove open to the westward of Salvington mill and Goring church (black spire) bearing N.E., leads over their western end in 29 feet water, and Navarino mills between Lancing grove and mill N.E. b. E., leads over their eastern end in 33 feet; Chichester church spire over the north part of Felpham trees, leads over their north-western part in 29 feet water, and to the southward of their eastern end in 7½ fathoms.

WINTER KNOLL is a small bank of chalk, with only 8 feet water on it, lying off the coast guard station at Elmer, and bearing about S.W. b. W. 2½ miles from Littlehampton lighthouse. The marks for the shoalest spot are, Arundel church in line with the middle of the eastern of two gaps in the Park trees, N.E. b. N.; Littlehampton church tower shut over the south end of Mussel row, (a long row of buildings near the harbour entrance), and Cisebury hill over the top of Highdown hill E. b. N. ¼ N. Off the south side of this shoal is placed a black buoy marked "Winter," in 17 feet water, with Arundel church in one with the centre of the eastern gap in the Park; Littlehampton church on with the southern house in Mussel row, and the Shelly buoy W. b. N. ½ N., distant 1¾ miles. Salvington mill on with the chalk pit on Highdown hill E. b. N. ¼ N. leads to the southward of the knoll.

The SHELLY ROCKS lie 1¾ miles to the S.S.E. of Felpham mills, with from 4 to 6 feet water over them in detached patches. On the outer or south-east patch Middleton church spire is in one with the east end of a conspicuous long barn bearing N.N.E. ¼ E., and the middle chalk pit on High down is on with the left of the two Rustington mills. A white buoy, marked "Shelly," is placed to the south-eastward of the rocks in 3 fathoms water, with the above marks nearly on. Felpham square black mill just open to the westward or left of the circular white mill N. b. W. ¼ W., leads to the westward in 3 fathoms, and Felpham mills on with Rooks hill, bearing N. ¾ W. will lead to the anchorage inside Bognor rocks in a fairway between Bognor spit and Shelly rocks.

MIDDLETON LEDGE is a low straggling ledge of rocks, projecting a short distance outside the general line of low water mark at springs, about midway between Felpham mills and Middleton church. Climping mill in one with the coast guard staff at Elmer leads on them. The ledge extends shallow in depths of 4 to 6 feet in a S.S.E. direction towards the Shelly rocks, and between it and the Shelly is a passage of 11 feet water, but no vessel drawing more than 9 feet should navigate at low water in-shore of the Shelly or Winter rocks.

ANCHORAGE OFF LITTLEHAMPTON.—There is very good anchorage for vessels of less than 10 feet draught in the 2 fathoms hole, with the outer warping post in one with the mill near the harbour bearing N. ¾ E., and Cisebury hill opening to the southward of the crest of Highdown hill; or at a mile from the harbour entrance in 13 feet water over chalk and gravel, with Salvington mill on with the chalk pit on Highdown.

In a vessel of 17 feet draught, anchor with the harbour open at about 1½ mile from the entrance, with Chanctonberry grove over the western chalk pits on Highdown, in 19 or 20 feet water, over chalk, stones, and gravel.

There is a position farther to the westward much approved of by the pilots, with Littlehampton church on with the coast guard houses east of the harbour mill, or the mill open west of the lighthouse: the Winter buoy bearing W. b. N. distant 1 mile. Should a vessel require to anchor before going into the harbour, it would be advisable (should the wind be easterly) to anchor off Rustington mills, as the stream will set to the westward by the time there is water to enter.

LITTLEHAMPTON HARBOUR is at the entrance of the river Arun, and lies W. b. N. ½ N., about 10 miles from the entrance to Shoreham harbour, and 30 miles N.W. b. W. from Beachy head. Two piers, 125 feet apart, run out from the entrance; the western pier is carried out 600 feet farther than the eastern one by which the beach and sand which works up from the westward is accumulated and prevented from washing into the entrance and forming a bar. In continuation of both piers is a low dicker-work, which is carried up to the level of the sands, and extends nearly out to low water mark; this serves to guide the stream in a fairway out, so as to scour the entrance and carry the *débris* as far seaward as possible, to prevent the formation of a bar. A row of warping posts is driven into the sand at 20 feet to the eastward of the dicker-work, the outer three of which are outside the low work, the termination of which on both sides is marked by a bush beacon.

A fixed red light is shown all night on the north end of the eastern pier at 30 feet above high water, and may be seen in clear weather at 7 miles. The depths in the harbour at high water springs are:—16 feet in the fairway off the warping post, 15 feet abreast the bush beacon on the end of the low western work, 17 feet between the piers, 16 feet abreast of the mill, and a general depth of 18 to 16 feet up to the ferry at the north-western end of Littlehampton. A vessel drawing 13 or 14 feet water can proceed up to Arundel, there being a towing-path on the port hand, and several berthing piles should she be obliged to stop for tide.

On the town side there is a dry dock, and at the ship yard on the western shore, a patent slip.

DIRECTIONS.—Approach the entrance to Arun river, with the outer warping post on with the lighthouse bearing north, and keep about a ship's length to the westward of the posts, taking care to be to the westward of the bush on the end of the low work and to make allowance for the stream which sets about 1 knot to the westward, and very strong (nearly 6 knots) up the harbour between the piers. After passing Mussel row, the stream slackens, and when near the berthing place, it is customary to let go the anchor and warp into a berth. Pilots are always in attendance, and provided with fine boats, so that the weather must be very rough when they cannot come off.

TIDES.—At Littlehampton it is high water, full and change, at $11^h\ 30^m$, springs rise 16½ feet; neaps 12 feet. The general depths over the bar are 14½ to 15½ feet at springs and 9½ to 11 feet at neaps. At Arundel it is high water at $12^h\ 25^m$. The stream in the river depends on the state of the country; thus, after heavy rains there will be a constant downward current.

The BOGNOR ROCKS are a ledge of high dangerous rocks running off from the shore a little to the westward of the town of Bognor, and extending in a south east direction for at least 1¾ miles; they dry some time before low water, in large detached blocks of conglomerate or pudding-stone, and are bold on their sea face. Their outer end, Bognor spit, lies a mile from the shore, and dries at five hours ebb, with from 13 to 17 feet inside of it; the marks for it are, Pagham church and Pagham watch-house in line N.W. b. W. ¾ W., and Felpham church open to the eastward of the two mills. Pagham watch-house open north of Pagham church N.W. b. W. ¼ W., leads a quarter of a mile to the southward of the ledge and Felpham white mill in one with a grove east of Rooks hill north, leads to the eastward; Middleton church spire on with Arundel church tower (white) leads to the S.E. of the spit. The Barn rocks lie about a mile to the westward of the Bognor rocks, and uncover at low water; but as they lie close to the shore, they are not at all dangerous, except for boats.

ANCHORAGE.—The anchorage in shore of the Bognor rocks is by no means

recommended as a general one, on account of there being no outlet if caught with S.E. winds, which bring a heavy sea on the coast. It is however used by small coasters chartered for Felpham and Bognor, and might be also used by coasters when not able to get as far as the park with strong westerly winds.

After rounding Bognor spit stand into the westward of Felpham white mill, and anchor when Pagham church opens to the northward of the coast guard houses; or when Bognor church tower is seen just to the westward of a large white house near the beach, and Arundel church tower opens to the westward of a large clump of farm trees.

PAGHAM BAY.—To the eastward of Selsea Bill the coast turns abruptly to the N.E. ½ N. for 3 miles, and then again as suddenly to the E. ½ S., forming a deep bight called Pagham bay, at the bottom of which lies the entrance to Pagham harbour.

The coast from the Bill to Pagham is a low shingle beach and must be approached by vessels turning along shore with great caution, as the flats extend off for at least 2 miles, where a depth of less than 3 fathoms will be found. Near the Mixon these flats bend out to the southward, connecting Eastborough Head to Selsea Bill, and effectually bar the eastern entrance to the Looe at low water to ships of heavy draught, but an ordinary attention to the lead will always give sufficient warning of approach to them. No landing can be effected at low water to the westward of Pagham harbour, except near Selsea Bill.

PAGHAM HARBOUR is so completely choked up by ever shifting banks, that as a harbour it is utterly useless. Selsea church stands on the western side of the entrance, and Pagham church on the eastern; they are both useful sea marks, the latter being the most conspicuous and has the tallest spire. Sidlesham water mill, which is easily recognised from the bay, stands with its face to the southward at the head of the harbour.

The coast to the eastward of the harbour changes its character to a low earthy bank rapidly crumbling away by the encroachment of the sea, with a flat and highly cultivated country at the back. The Pagham coast guard dwellings and watch-houses are useful and distinct objects from the sea, and stand a short distance to the east-ward of the harbour. Nye timber windmill may also be seen a little to the northward of the watch-house.

BOGNOR, now become an extensive and very fashionable watering-place, shows conspicuously from the sea in every direction. Felpham white mill stands close to the edge of the coast, about half a mile to the eastward of the town, and is a remarkable and very valuable sea mark. The venerable little church of Felpham may also be seen about half a mile at the back of the mill, and having no spire is distinguished from Bersted church, which stands about a mile to the westward of it; during the summer it is nearly hid by the trees.

THE PARK.—The anchorage in Pagham bay between the Owers and the coast is familiar to seamen under the name of the Park, which is well sheltered from the violence of W. and S.W., winds, but most unsafe with the wind anything to the eastward of south. The holding ground is excellent, being a stiff clay under a thin crust of gravel; but the anchorage cannot be recommended as a refuge for large vessels owing to the frequent and sudden shifts of wind, and the astonishing rapidity with which the sea gets up. The above observation is particularly applicable during the winter months, for a long dreary night in the Park is anything but a desirable situation to be placed in.

Small vessels may bring up with the Mixon beacon bearing W.S.W., and Pagham watch-house on with Chichester spire, in about 3 fathoms at low water; but large vessels should anchor further out and more to the eastward, with the spire to the westward of Bow hill, the Mixon beacon bearing W. b. N., and the Owers light vessel S. b. W. ½ W., both for greater depth of water and increased facility of getting away from the coast, in the event of being surprised by a shift of wind. The nearer the Mixon is approached, the stronger the tide runs.

TIDES. It is high water at full and change on the shore in Pagham bay, near the entrance of the harbour at $11^h\ 30^m$; rise at spring 16 feet, at neaps 8 feet

6 inches. At Bognor it is high water at full and change at 11h 30m; rise at springs 17½ feet, at neaps 12 feet; neaps range 9 feet. In the Park the eastern stream makes at 4h 5m and sets east, and the western stream at 9h 50m, and sets for the first 3 hours about west; between the 3d and 4th hours it slackens, and runs from W.S.W. to S.W. b. S., gradually trending to the southward until the eastern stream makes; the velocity never exceeds a knot and a half.

SELSEA BILL is a low earthy projection of the coast, and shows when above the horizon in a remarkably sharp low point when seen on either side.

The OWERS appears to be applied indiscriminately as the general name, as well for the foul ground off Selsea Bill, as to those extensive and dangerous patches of rock at least 5 miles to the south-east of it, and, with the exception of the Swatchway, it may be properly considered as one unapproachable ledge of dangerous high rocks. Distinguishing names have been given to the different parts of this shoal; and as they are well known to the local pilots, fishermen, &c., and will materially assist the seaman in acquiring a knowledge of its navigation, they will be adopted, and their positions particularly pointed out.

The DRIES.—About three quarters of a mile to the westward of Selsea Bill, and abreast of the High house at Street, the Owers have their commencement, and run off in two parallel ledges, called the Streets, which are awash at very low water springs to the distance of a mile S.W. b. W. ¼ W. from high water mark. From thence they trend suddenly away S.E. b. S. for rather more than three quarters of a mile under the name of the Grounds or Malt Owers at their western end, and the Dries at their eastern end. About a quarter of a mile to the southward of the Dries, a Chequered Black and White Buoy is laid down in 7 feet water; the marks for which are, Rooks mill on with the High house, N.N.E. ¾ E., and Nelson monument in one with the west end of Hayling trees N.N.W. ½ W.

The MIXON.—A mile E.S.E. of the Dries lies a considerable mass of high rocks, the eastern and highest part of which is called the Mixon, and the western and lowest end the Bullaker. The Mixon covers at a quarter flood, and the Bullaker soon after low water. Between the Bullaker and the Dries there are from 10 to 14 feet water gradually shoaling to the shore. A substantial Beacon is erected on the highest part of the Mixon, close to the eastern end; a very useful object for vessels navigating the Looe, and a valuable sea mark for the outlying dangers. The summit of the Beacon, which is surmounted by a triangular framework, is 28 feet above high water. An extraordinary deep hole, of no great extent, is scooped out near the south-east end of the Mixon close to the face of the rock, having upwards of 12 fathoms in the deepest part. At low water there is no channel between Selsea Bill and the Mixon, and they are connected by a gravelly bank interspersed by mud and weed, which dries at low water springs.

The BRAKE, or CROSS LEDGE, is a reef of uneven rocks running out about S.W. b. W, from the Dries, to which it is joined, and forming a rocky bar to the western entrance of the Looe, with a depth of from 10 to 25 feet water over it.

The BOULDER BANK, which commences at the south-west end of the Cross ledge and runs out in the same direction, is a very dangerous shoal of gravel and large stones with rock occasioually jutting out, and having very little water over any part of it. Its shoalest part is near the outer end, where at springs there are not more than 2 feet water, and as little as 8 feet will be found within a boat's length to the southward of the Pullar buoy. The marks for the shoalest part are: Chichester spire open 2° to the westward of Selsea mill, N.E. b. N., and Pagham coast guard watch house just open of Selsea bill, N.E. b. E. The west end of Medmerry barn in one with Chichester spire N.E. b. N. is a close mark for clearing the bank to the westward. A Red Beacon Buoy called the Pullar is placed at the north-east or inner end of the Boulder bank, in about 16 feet water, and marks the southern boundary of the entrance of the Looe. The marks for the Buoy are: Selsea mill on with the fall of the east shoulder of Rooks hill, N.E. ¾ N., and Selsea watch-house in line with the Luff, N.E. b. E. ½ E.

PULLAR BANK.—From the south-west end of the Boulder bank, which lies

3 miles from the shore, the shoal takes a sudden bend to the S.E. b. E. and continues straight in that direction for 3½ miles; that part nearest the Boulder Bank is called the Pullar bank, which is a succession of high heads of gravel and rock, with a depth over them varying from 6 to 10 feet water. About 1½ miles to the eastward of the Boulder bank there are two very narrow channels over the Pullar bank which show themselves very distinctly when the tide is running, by the ripple over the shoals near them; and as they carry a depth of from 3½ to 4 fathoms, they might serve a useful turn to small vessels, although from their extreme narrowness they can scarcely be recommended as perfectly safe. The Mixon beacon in one with the first clump of trees to the eastward of Pagham church, leads through the western channel in about 20 feet; and the beacon in one with Chichester spire leads through the eastern channel, but in rather less water.

The MIDDLE OWERS is the eastern end of this ledge, and limits the principal or main Swatchway to the westward. This part of the shoal is composed of large blocks of stones, if not rock, alternating with patches of coarse gravel, having one high and dangerous head on it which nearly dries at low water. A Striped Black and White buoy called the Middle is laid down in 25 feet water the eighth of a mile inside of the shoal, and just abreast of the shoalest part. The marks for it are: Pagham church in one with the highest part of Rooks hill N.N.E., and the Luff in line with Felpham church, N.E. ½ E. Selsea coastguard houses in one with the east end of the plantation which stands to the westward of Bow hill N. ¼ E. leads also to the buoy, and scrapes the highest head of the shoal to the eastward.

SWATCHWAY.—About half a mile to the eastward of the highest part of the Middle Owers, the shoal breaks down into 6, 7, and 8 fathoms water, and is well known as the Swatchway. Although this channel affords an ample depth of water for vessels of any draught, yet it is of great importance to warn the mariner that, before he can arrive at it from the eastward, or soon after passing through it from the westward, he must inevitably be entangled amongst the shoal flats in the Park, on some parts of which there are not more than 2¾ fathoms at low water. Vessels of heavy burthen, must, therefore, closely watch the rise of tide, if they intend to avail themselves of the Swatchway.

In running through this channel from the S.E. or N.W., the Mixon beacon in one with Street coast guard houses, bearing N. b. W. ¾ W., will lead through the centre of the Swatch and well clear of all the western face of the Outer Owers; but in coming from the eastward Kinnaird house must be kept over the Clarence hotel, which stands at the eastern end of Bognor N.E. ¼ N., which will clear the east end of the Middle Owers, and lead to a good anchorage in the Park. A good mid-channel leading mark, and one generally adopted, is Selsea Corner in one with the White-way on Bow hill N. ¾ E.; but it frequently takes a vessel out of her course to get it on.

OUTER OWERS.—Nearly two miles from the south-eastern edge of the Middle Owers, that alarming and dangerous patch of foul ground known as the Outer Owers suddenly rises, and spreads to a considerable extent, and what with the strength of the tides, the tremendous sea in southerly gales, and the shallow water over it, there is not a more dangerous shoal in the English channel. It is difficult to define the limits of this shoal, but allowing it to lie between the inner edge of Eastborough Head and the outer prong of the Elbow to the depth of 4 fathoms, its length is about 2 miles in a N. b. E. and S. b. W. direction, and its broadest part rather under a mile.

SHOAL of the LEAD.—Over a considerable extent of the Outer Owers there is not more than 12 feet water; but that part called the Shoal of the Lead demands a particular notice, as from 2 to 3 feet only can be relied on, over it. The marks for the shoalest part are, Chichester spire half way between Pagham church, and a single tree, which is a remarkable object near the coast a short distance to the eastward of the church, N. ¼ E. and Portsdown windmill its own breadth open north of the Mixon beacon N.N.W. ¾ W. The Mill and Beacon in line scrapes the south-western edge of the highest part of the shoal in 7 or 8 feet water.

The ELBOW which is the outer or southern prong of the Outer Owers, lies S.S.W. nearly three quarters of a mile from the Shoal of the Lead, and outside or to the southward of the Light vessel. As there are no good marks to define its position, great caution must be observed in approaching it, as it is steep-to, and a depth of 30 fathoms will be found within a hundred yards of its extreme point.

EASTBOROUGH HEAD are high rocks at the inner part of the Outer Owers, carrying a depth of only 6 feet at low water. There is no safe passage between them and the Shoal of the Lead.

WEST HEAD:—A reef of rocks bends back to the westward rather suddenly from Eastborough Head, and then runs in a straight line for half a mile towards the Middle Owers, where it breaks down into deep water and forms the eastern boundary of the Swatchway already described; it is called the West Head.

EAST BANK.—A bank of gravel and sand seems to have been thrown up within a few years about a mile to the eastward of Eastborough Head which from its position has been named the East bank. The least water on it is 19 feet, which renders it a formidable danger to ships of great draught. A Black Beacon Buoy is laid down a very short distance to the eastward of its shoalest part, and as there are only 21 feet water at nearly a quarter of a mile outside of it, some precaution is necessary not to pass within that distance of the buoy. Selsea mill in one with Selsea coast guard watch house N.W. ½ N., and Nye Timber windmill a little open to the eastward of Chichester spire, N. ¼ W., point to the buoy; Chichester spire in one with the west end of the plantation on Bow hill, N. ½W., or Bersted church in line with the eastern end of Goodwood N. b. E. ½ E., leads to the eastward of the bank. Bersted church may be distinguished from Felpham church by its spire. Although there is a good channel with 26 feet water in it between the East Bank and Eastborough Head, the mark for which is Pagham watch-house in line with Chichester spire, bearing North, yet it is recommended that large vessels should pass to the eastward of the buoy.

The OWER'S LIGHT VESSEL is moored half a mile S.E. b. E. from the edge of the Shoal of the Lead, in 13 fathoms water over gravel and broken shells, and exhibits a single Bright Fixed Light at an elevation of 46 feet above the water, on a mast placed in the centre of the vessel, and which may be seen in clear weather at the distance of 10 miles. A red ball 6 feet in diameter is carried at her mast-head, the top of which is 66 feet above the water, and during foggy weather a gong is sounded, but when a vessel is seen standing into danger a gun is fired. The following marks show her position:—The High house at Street on with the west end of the six clumps of trees on Portsdown hill, N.N.W. ½ W., and Chichester spire in one with the Single tree, a little to the eastward of Pagham church, North; the outer point of the Elbow bears W.S.W. ¼ W. four-fifths of a mile, the Nab Light vessel N.W. b. W. 14 miles, and Dunnose W.N.W. ¾ W. 20½ miles.

HOOE BANK.—Outside of the Owers, from the Boulder bank to a mile to the eastward of the Elbow, an extensive field of rock with from 7 to 9½ fathoms water over it presents to the mariner, by a close attention to his soundings, a most valuable warning of his approach to the Owers. Abreast of the Boulder, it extends off about 3 miles to the S.S.W. with 12 to 20 fathoms water inside of it, but the deep water does not continue further to the westward than the west end of the Boulder bank, its western limit being pretty accurately defined by the mark for clearing the Cross ledge. To the eastward as the Outer Owers is approached this bank narrows considerably, forming a sort of tail to the main body, and partially separated from it by a narrow swatch of rather deeper water; this part is called the Hooe bank, which is fully 3 miles in length in a E.S.E. and W.N.W. direction, and about a quarter of a mile broad, the outer part being nearly a mile and a half from the Elbow, and the eastern edge bearing south 2 miles from the Light vessel. Bersted church in line with Goodwood, N. b. E. ½ E., leads to the eastward.

The least water on the Hooe bank is between 7 and 8 fathoms, with the Light

vessel in one with Felpham white mill, and the Mixon beacon in line with Street watch-house, and as little water as the above will occasionally be had on the western or large bank; but the depth within the Hooe ranges from 13 to 30 fathoms, the greatest depth being near the south-western edge of the Elbow. The Hooe very clearly shows itself by the overfall of the tide, which occasions a heavy broken sea, when running to windward in blowing weather.

DIRECTIONS.—The course from any position off Portland to a corresponding position off St. Catherine point is about E.S.E. ½ E. 45 miles; and from thence to Beachy Head E. b. S. 60 miles. In the latter interval a vessel should not approach the shore within the depth of 25 fathoms; by which precaution she will pass without or to the southward of the Elbow of the Owers, and also preserve the fair-channel tide.

The soundings between the Isle of Wight and Cherbourg, with reference to the Channel fair-way, are so irregular, that the course for a running ship cannot be designated with that degree of precision which the narrow limits of the Channel there require; at the same time, these transitions from deep to shoal water will be equally in favour of a working ship, or of one crossing the Channel. The general quality of the bottom to the southward of the fairway is coarse, loose, unconnected, or rocky; the stones are in general covered with a reddish incrustation. Within the distance of 15 miles of the coast of Hampshire and Sussex the soundings become finer, being chiefly sand mixed with fine gravel, which continues as far eastward as Beachy head.

In approaching the Outer Owers from the eastward, large vessels should not stand farther to the westward than to have Bersted church in one with Goodwood, bearing N. b. E. ½ E., which also clears the East bank, until Selsea mill opens to the S.W. of Selsea watch-house, when the Light vessel may be safely steered for, and passed to the eastward at any convenient distance; but to avoid the Elbow care must be taken not to open Felpham white mill to the westward of the Light vessel, or to bring the vessel to the eastward of N.N.E. ½ E., until the Red Clay Cliff in Sandown bay opens south of Culver cliff N.W. by W. ¾ W., which will leave the Elbow three quarters of a mile and the Middle Owers and Pullar bank 1½ miles to the northward. As the Isle of Wight is so distant, there may be great uncertainty of seeing this mark, when the Light vessel should not be brought to the eastward of N.N.E. ½ E. until a shoal cast (under 10 fathoms) is struck, which is a sure indication of being on the Hooe bank; when, if bound to Spithead, the course may be altered to about N.W. ¾ W. for the Nab light vessel. A vessel will be to the westward of the Outer Owers when the Mixon beacon is in one with the Street coast guard houses bearing N. b. W. ¾ W.; abreast of the Middle Owers, when Pagham church comes on with Rooks hill N.N.E.; and to the westward of the Boulder bank, when Medmerry barn is in one with the spire of Chichester cathedral N.E. b. N.

In turning to windward either up or down channel, with a certain conviction of being to the westward of the Outer Owers, the Light vessel should on no account be brought to the southward of E.S.E., which will leave all the dangers between the Swatchway and the Boulder bank about half a mile to the northward. As the lead should invariably be kept going, and great attention paid to the soundings, certain intimation will be had when the rocky banks to the southward of these shoals are crossed, and the first deep cast afterwards in standing in must be the seaman's warning of his approach to them. Attention is again drawn to the important fact, particularly in thick weather, that, failing to obtain a deep water cast, by which is understood over 9½ or 10 fathoms, the seaman may be tolerably certain that his vessel is to the westward of the Boulder bank; and therefore great caution is requisite not to get embayed by standing in too far.

AT NIGHT.—Very little information can be added to the above remarks for the seaman's guide at night; the bearing of the light, and a careful attention to his lead, will be his best and only safeguard. Coming from the eastward, the Owers light should not be brought to the westward of W. b. N. ½ N., nor the water shoaled to less than 10 fathoms, which is a safe line for the largest vessel;

and after passing about 1½ miles to the southward of the Light vessel the light should not be brought to the eastward of N.N.E. ½ E. until the Hooe bank is struck, or rather crossed; or after passing the above distance to the southward do not steer to the westward till the light bears N.E. b. E., after which a course may be shaped for the Nab light.

It was observed that, having passed to the westward of the Outer Owers, the Light vessel should not be brought to the southward of E.S.E.; but at night, and in large vessels particularly, it will be prudent not to stand into less than 10 fathoms, which will insure being to the southward of the rocky banks until the Nab light is seen, when there can be no danger as long as that light is not brought to the westward of N.W. b. W. The depth of 10 fathoms is also a valuable guide for vessels rounding Dunnose; for by keeping outside of it they may be assured of being clear of all danger until to the westward of Culver cliff, or as long as the Nab light is to the northward of N.N.E.; after which St. Catherine light had better be kept in sight. If near the western end of the Boulder bank, and steering for the Nab, a vessel will have the western tide about two points abaft the beam; and as it runs strong, particularly at springs, some allowance must be made especially with a scant wind.

The LOOE STREAM must not be passed over without some general directions for its navigation; but it is needless to observe that, lying as it does within the whole line of dangers, barred at its western entance by turbulent overfalls, and having in many parts of it a depth of not more than 16 feet at low water, the channel can only be used safely by vessels of little draught, or by those locally acquainted except under very favourable circumstances.

DIRECTIONS.—In approaching the Looe stream from the westward, the greatest care must be taken not to get too close in-shore; and as the Cross ledge is approached, the Mixon beacon should not be brought to the northward of the Dries buoy, or Nelson monument must be well open of Hayling trees; by neglecting some such precaution as this, a stranger is very likely to get entangled with the Streets, and as the eastern stream sets very strongly towards the Boulder bank, some caution is necessary in light winds.

In crossing the ledge, give the Dries buoy a sufficient berth, for as little as 11 feet will be found a quarter of a mile to the southward of it; and the nearer the Pullar buoy the better, but always leaving it to the southward. If the Isle of Wight is tolerably clear, an excellent mark for leading the whole way through the Looe and over the Cross ledge in 14 feet water is, Little See-me-not just showing south of Culver cliff, bearing W.N.W. ½ W.; or, should this mark not be distinct, run with the two clumps or fir gardens on Portsdown hill on with the south-west end of Hayling trees, N.N.W. ¼ W., until Felpham white mill is observed to be opening out clear of the Mixon beacon, beyond which cross mark the above line is not safe to continue, leading as it does over the Pullar bank; the course must then be altered so as to have the beacon about two points on the port bow. (The Pullar buoy in one with Culver cliff, is also a very good line for leading through the Looe.) When the Mixon bears north or N. b. W. the vessel may be considered as through the channel, and entering into that part of Pagham bay known as the Park.

Great caution is requisite not to be caught by night in the Looe; the seaman therefore should not attempt the passage except with a strong breeze and plenty of time before him to be certain of getting through in daylight, neither should he attempt it with an adverse tide.

Small vessels, under favourable circumstances, and in fine weather, frequently work through the Looe; in so doing care must be taken not to stand farther to the southward than to have the Middle buoy in one with the light-vessel; but this line is only safe as long as Felpham mill is open of the Mixon, and in shooting over the Cross ledge, contrive to pass near the Pullar buoy. The Middle buoy is a sufficient guide of itself, when to the eastward of it, by not attempting to pass it to the southward until Kinnaird house is in one with the Clarence hotel, N.E. ¼ N., which is in one of the Swatchway marks.

On the north side of the channel care must be taken in turning to windward

not to stand so far over as to get between the Dries buoy and the Mixon, for the rocks are high and dangerous; the buoy should not be brought to the westward of N.W. Abreast of the beacon the rocks are steep-to, but still it will be better on account of the strong eddies to give it a moderate berth. To the eastward of the Mixon stand no farther to the northward than to have the beacon bearing west, which will ensure 15 feet at low water.

TIDES.—At Selsea Bill it is high water, at full and change at $11^h\ 45^m$; rise at springs 16½ feet, at neaps 8½ feet. At the western entrance of the Looe stream, near the Pullar buoy, at full and change, the eastern stream makes at $3^h\ 45^m$, and the western stream at $10^h\ 0^m$, and sets S.E. and N.W. Between 2 and 3 miles outside the Boulder bank the stream turns about an hour later; the eastern stream setting E.S.E., and the western stream west. Between the Pullar bank and the Middle Owers the eastern stream sets E.S.E, and the western stream west. At the eastern entrance, near Eastborough Head, the eastern stream makes at $4^h\ 30^m$, and sets E.N.E. ½ E., and the western stream at $9^h\ 50^m$, and sets west. Off the west end of the Hooe bank the eastern stream makes at $4^h\ 35^m$ and sets E.S.E., and the western stream at $10^h\ 30^m$ and sets W. ¾ N.

SECTION VI.

SELSEA BILL TO ST. ALBAN'S HEAD.

VARIATION 22° WEST.

CHICHESTER HARBOUR.—The coast guard watch-house at the entrance to Chichester harbour bears from the entrance of Langstone harbour S.E. b. E. ½ E. 4 miles, from Selsea Bill N.W. b. N. 6 miles, from Nab light-vessel N.E. b. E. ½ E. 5 miles, and from the Pullar buoy N.N.W. ¼ W. 6½ miles. Although a considerable trade is carried on in this harbour, yet the entrance to it is bad, as it has a bar, with only 2 feet over it at low water springs, and a shoal flat, which is a continuation of the Horse and Dean sand, extends off abreast of it for at least 2 miles, where there is not more than 15 feet at low water.

The gravel banks dry for 1½ miles at least from the Watch-house point, off the eastern side of the entrance, and are known under the name of the East Pole sand, which is very high in some parts, and constantly undergoing alteration with each gale of wind and spring tide during the winter months. The general direction of the banks is about W.S.W., thus throwing the entrance to the harbour to the westward, the reverse of Langston. In the summer of 1843, the higher banks lay a long way out and had not more than from 5 to 6 feet water over them at high springs. On the western side of the entrance, a bank of inconsiderable extent called the West Pole, runs out about a short quarter of a mile from Eastoke point.

DIRECTIONS. — No prudent seaman, without a thorough knowledge of Chichester harbour, should attempt it with a pilot, who will be found constantly on the look-out at tide time at Watch-house point, as there are no buoys or beacons to mark the channel. Should it, however, so happen that he is driven to take the harbour without a pilot, care must be taken to preserve a tolerable offing until a proper rise of tide for entering; and for this purpose, it should not be approached nearer, than to have Haslar hospital open of or just touching Southsea castle, which will ensure 3 fathoms at low water. In fine weather and smooth water an anchor should be dropped under foot, if too soon upon the tide, and as the ground is everywhere good, the position chosen for so doing must depend upon the direction of the wind. As there is no channel into the harbour, except to the westward of the East Pole, a vessel should not anchor farther to the eastward, in westerly winds, than to have the Coast guard watch-house to the eastward of Bow hill.

In coming from the southward or eastward, especially with the wind in that direction, the best mark for crossing the bar is, the Watch-house in one with a remarkable plantation to the eastward of Bow hill N.E. b. E. ½ E., which will lead well into the fair-way; and when there, which the increased depth of water will give a sufficient warning of, steer up between the points, the nearer in mid channel the better, as on the strength of the tide the eddies are very strong on both sides, either within or without the points, according as it is flood or ebb.

Entering the harbour from the westward run with Cackham tower on with Berry barn E. b. S. ½ S. which will lead to the northward of Hayling knob, and over the bar, in 17 feet at high water springs; but as this line will also lead on the highest part of the East Pole, care must be taken not to continue on it longer than to have the fair-way mark on. When there is any swell outside,

the sea breaks furiously over the Poles, and even right across the entrance, particularly with southerly winds and on an ebb tide.

If bound for Emsworth, the western branch of the harbour must be taken, the channel of which lies close to the high shingle point on the western side of the harbour; but as it would be folly to attempt to proceed further up without a pilot, the anchor should be dropped to prevent confusion, and as there is no avoiding the strong tide (which on the ebb is very rapid), a good look-out must be kept, in the event of the vessel driving.

In the eastern or Chichester branch, there is very fair anchorage for many vessels even of considerable burthen; but a sort of inner bar or shoal flat connects Watch-house point with Gardner head, and a vessel, to have the best water over it, must bring the Old cottage at East Saltern in line with the high water shingle point on the western side of the Emsworth channel. This mark will lead to the anchorage, which may be said to commence about half a mile to the eastward of the Watch-house, or soon after passing the Coast guard hulk, in from 4 to 5 fathoms at low water. With the probability of remaining any length of time at this anchorage, it would be prudent to steady the vessel with a stream anchor, and for this purpose the small bower should be let go near the middle of the stream, and the small anchor carried over towards the southern mud; veer upon the bower, and heave in upon the stream which will take the vessel out of the strength of the tide, and also out of the fair-way, and she will have an open hawse up the harbour, which is advisable, as the ebb rushes down with great rapidity. The bower will also be a safe precaution against driving over upon the southern mud, which there would be some danger in doing, in strong northerly winds.

Chichester lake is navigable to Dell Quay, within 2 miles of the city.

TIDES.—It is high water in Chichester harbour, full and change, at $11^h\ 32^m$, and just within Watch-house point springs rise 15 feet, and neaps about 11 feet. About a mile outside the bar, the set of the tide is nearly rotatory and of very little strength, turning to the eastward at $4^h\ 50^m$, and to the S.W. at $12^h\ 45^m$. Between the points and in the channel over the bar, when the banks are uncovered, it runs with great force.

BRACKLESHAM BAY lies between Chichester harbour and Selsea Bill; the coast runs very nearly in a straight line, and forms a low earthy bank, which is seriously encroached upon by the sea. There are many conspicuous objects near the shore, which being very useful sea-marks, it may be well to point out their relative positions.

Berry barn is a large and remarkable building close upon the edge of the coast, about a mile to the eastward of Watch-house point and is the second building from it; Oxtall barn being about half a mile to the westward. West Wittering church, having a spire, is conspicuous, and lies a short distance back. Cackham tower is a high brick ruin, a quarter of a mile to the eastward of Berry barn, and about the same distance back from the coast, and has a plantation near it, the little village of Circum runs close down to the coast, and may be known by a row of white houses near the beach belonging to the coast guard, the first station east of Chichester harbour. Circum windmill, a very useful mark, stands at the back of the village, and the first farm building to the eastward is called Bracklesham farm. Thorney coast guard houses stand 2¼ miles to the south-eastward of Circum station; and three-quarters of a mile to the eastward of the above, and rather more than a third of the distance to Selsea Bill, is Medmerry barn, one of the objects used for clearing the Boulder bank. Selsea windmill stands a quarter of a mile to the eastward of Medmerry barn, and further back. The coast guard houses at Street, a very useful sea-mark, are between Medmerry barn and Selsea Bill; and immediately behind them stands a remarkable high house at the south end of the village of Selsea, or, as it is sometimes called, Street.

DIRECTIONS.—Small vessels under 14 feet draught may turn to windward in-shore out of the tide in Bracklesham bay frequently with advantage, by a close attention to the lead and the following directions, bearing in mind not to

stand within half a mile of the shore, as the bank is steep-to, shoaling suddenly from 4 to 2 fathoms. A vessel will be to the eastward of the Poles when Cackham tower is in one with Chichester spire, and the low water banks are cleared, when West Wittering church is in a line with the cathedral; but to insure clearing the whole of the shoal flat which extends off from Chichester harbour, the coast should not be approached until the cathedral is open to the eastward of Circum windmill. From thence to the Street rocks, the bay is safe, with the exception of the Medmerry bank and the Hounds rocks; the latter are awash at low water.

MEDMERRY BANK, which lies 2 miles from the coast W.S.W. of Medmerry barn, is rather an extensive shoal of gravel and broken shells, and nearly streams with the entrance into the Looe. Its direction is nearly north and south, three-quarters of a mile long, and not less than half a mile broad. The marks for the shoalest part of 13 feet, which is near its centre, are:—Selsea mill in one with the Luff, (a clump of trees on the left shoulder or western part of the high ground to the eastward of Rooks hill), E.N.E.; and the two clumps or fir gardens on Portsdown hill on with the south-west end of Hayling trees. The north-east end of the large chalk-pit on Portsdown hill in one with the south-west end of Hayling trees, leads in 4 fathoms to the westward; the Watch-house at the eastern entrance to Chichester harbour N. b. W. ¼ W. leads to the eastward; and Bracklesham farm in line with Bow hill leaves it to the southward. As there is very little less water on this bank than must be passed over in taking the Looe channel, it is not a danger to vessels intending to do so; but it would be imprudent for those of heavy burthen to come within the line of the Boulder bank, for a rocky patch called the Bullock lies W. ¾ N., nearly 5 miles from Selsea Bill, carrying a depth of only 28 feet at low water springs. Ashy Down tower in one with Bembridge church spire W.N.W. ¾ W., clears its southern edge. A Red buoy is laid down in 7 fathoms water about a quarter of a mile to the south-westward of the patch.

HOUNDS. — A patch of rocks called the Hounds is connected with the coast at their eastern end immediately under Thorney coast-guard houses, and uncover at spring tides for rather more than half a mile off-shore in a W.N.W. and E.S.E. direction. Nelson monument over the west end of Hayling trees, leads a fair mile outside of them.

LANGSTON HABBOUR. — The entrance to Langston harbour lies E. ½ S., 2½ miles from Southsea castle between Cumberland fort and Gunnen point. The harbour which separates Portsea and Hayling islands from each other, is utterly worthless as a port, except for vessels of the smallest class, as it has a bar which nearly dries at low water, and it can only be entered by crossing the Horse and Dean sands.

The gravel banks which dry off for at least a mile from the mouth of the harbour on both sides are called the East and West Winners. The former runs nearly straight out from the coast; but the latter, after extending three-quarters of a mile, suddenly turns to the eastward towards the spit of the other, almost blocking up the entrance, there being only a foot water between them on the bar at low springs. These banks frequently shift, and in height they are seldom the same before and after a gale of wind. In 1843 there were only 9 feet over the outer bank at high water, and not more than 7 feet upon the inner part of the eastern Winner. In blowing weather, if any swell is up outside, there is one sheet of broken water with heavy rollers over them. Haslar hospital open of Southsea castle bearing N.W. leads to the southward of the banks in 9 feet at low water.

DIRECTIONS. — A vessel in running over the bar into the fair-way should bring the west end of officers' houses in Cumberland fort on with the eastern end of the large chalk-pit on Portsdown hill, bearing N. ¾ W.; and as soon as the water deepens she will be in the channel, when a course should be steered right up between the points. There are no regular pilots at Langston, but if none of the local fishermen are at hand, the anchor should be dropped when in safety, and wait for further assistance.

TIDES.—As the tide sets furiously between the points and in the channel when the banks are uncovered, it would be useless for a vessel to attempt entering against it; the best time for running in is about an hour before high water. It makes into the harbour, full and change, at $5^h\ 0^m$, and out or to the southward at $12^h\ 0^m$, which is 24 minutes later than high and low water by the shore, the rise being 18 feet 2 inches at springs, and 9 feet at neaps, but very uncertain to a foot or two.

HAYLING BAY lies between Langston and Chichester harbours, the shore being the whole southern face of Hayling island, which is one uninterrupted line of shingle. Many of the objects near the coast on this island are useful and familiar sea-marks; the most prominent are, Hayling church, the trees in the village, and the new buildings near the beach. To the eastward of the Dean Elbow buoy rather deeper water may be carried closer in-shore, but the difference is scarcely appreciable until about a mile to the eastward of Chichester harbour. The soundings are, however, so regular, and the water shoals so gradually with a few exceptions, that there can be no difficulty in keeping off a proper distance according to the vessel's draught.

HAYLING KNOB.—A small patch of foul ground lies about a mile to the eastward of Langston harbour, called the Church rocks; but they are close in-shore, and form no prominent shoal. There is, however, a small gravel bank, Hayling knob, outside of the Church rocks, which deserves some particular notice, as it lies $1\frac{1}{2}$ miles from the land, and carries a depth of only 8 feet, with as much as 14 feet water inside of it. The marks for the shoalest part are, Sinah barn on with Portsdown windmill N. $\frac{1}{4}$ W., and Cackham tower its own breadth open south of Berry barn E.S.E. $\frac{3}{4}$ E. The tower in one with the barn, leads to the northward; and Haslar hospital open of Southsea castle bearing N.W., to the southward.

South side of the Isle of Wight and to St. Helens' Road.

ST. CATHERINE POINT.—From the Needles towards St. Catherine point the land continues gradually to rise, St. Boniface down, above Dunnose, being 770 feet above the level of the sea. From thence it declines towards Culver cliff, the eastern end of which, being composed of chalk, may be easily known from the great contrast it exhibits to the land in its vicinity. The pitch of the cliff which falls gradually from the highest part of Bembridge down, rises 213 feet above high water mark spring tides, while the crest of the down is elevated 312 feet above the same level.

LIGHT.—A lighthouse is erected on the St. Catherine point, the vane of which is elevated 118 feet from the base, and the lantern 178 feet above high water. It shows a brilliant Fixed light which may be seen in clear weather at the distance of about 18 miles.

RACE.—The overfalls off St. Catherine point and Dunnose are partly caused by the various sudden transitions from deep to shoal water in that neighbourhood. They are, however not dangerous except in bad weather, when no open boats should attempt to pass through either. The race off St. Catherine point varies in proportion as the wind is with or against the tide. In gales from the westward, and during spring-tides, the sea breaks to the south east of the point as violently as in the race of Portland.

CULVER CLIFF.—From Culver cliff to Bembridge point, which is low, the direction of the coast is E.N.E. $\frac{3}{4}$ E. for nearly $1\frac{1}{2}$ miles, gradually decreasing in height until it terminates in the point. The coast-guard watch-house is a conspicuous little white cottage, standing on the edge of the bank 89 feet above high water; the place of its position is called Black Rock, about half-way between the cliff and the point. As the point is approached Foreland farm will be observed, which is a useful and well-known sea-mark.

SHAG ROCK.—A small reef extends off nearly the eighth of a mile from the base of Culver cliff, the outer part of which dries at low water, and a large rock

lies at the S.W. point of the cliff, which covers only at high water springs; it is called by the fishermen the Shag rock.

WHITE CLIFF BAY.—To the eastward of Culver cliff, which doubles back for a short distance to the northward, there is a small bay of fine sand, where a limited extent of clear ground may offer tolerable shelter out of the stream, with the wind off-shore for small vessels waiting tide. The east pitch of the cliff W. ¾ N., and the coast guard Watch-house N. b. E., will place a vessel half a mile off shore in 2½ fathoms.

White cliff bay terminates at Black rock, and from thence to Bembridge point the coast is fringed by one unbroken shelf of rock, uncovering at low water to the extent of nearly a third of a mile from the shore. These rocks are high and very steep at their outer edge, and over many parts of them at high water springs there is not more than 3 or 4 feet water; but from their edge it rapidly falls into 2 fathoms, which depth will be found throughout at the distance of half a cable's length. Within their margin, just within the point called Sharpus, on a small sandy patch which dries at low water, the fishermen find a valuable shelter for their small boats during the fishing season.

PRINCESSA SHOAL is an extensive and irregular patch of foul ground, the body of which bears from Culver cliff E.S.E.; and S.S.E. from Bembridge point. The shoal is nearly 1¼ miles in length in an E. b. S. and W. b. N. direction, and near its western end rather more than half a mile broad. The water over it varies from 3 to 5 fathoms, the shallowest part being near the north-western edge, where a ridge rises a quarter of a mile in length, running east and west, and carrying a depth of as little as 19 feet at low water; but as there are several shoal heads of from 22 to 24 feet scattered over its surface, large ships should be cautious how they cross any part of it. The shoulder of Appuldercomb hill in one with a white cottage (Red Hill farm) W. ¾ N. leading to the southward and the spire of Bembridge church in one with Foreland farm N. W. ½ N. to the northward.

Two buoys mark the shoal: the N.W. or inner buoy (white) is placed close to its north-western edge in 30 feet water; Culver cliff bearing W. b. N. $1\frac{6}{10}$ miles, Bembridge point N. b. W. ¼ W. $1\frac{1}{10}$ miles, and Nab light-vessel N.E. b. E. $\frac{6}{10}$ miles.

The S.E. or outer buoy (black) bears from the white buoy S.S.E. ½ E. half a mile, and is laid down rather more than one-tenth of a mile within the southern edge of the shoal in 26 feet water; Culver cliff bearing N.W. b. W. ¾ W $2\frac{3}{10}$ miles, Bembridge point N. b. W. ¾ W. $1\frac{6}{10}$ miles, and Nab light-vessel N.E. ½ N. $1\frac{8}{10}$ miles.

BEMBRIDGE LEDGE extends seven-tenths of a mile off Bembridge point, having only 18 feet water over its outer edge. A black buoy marks its outer extreme, in 25 feet water, just within the depth of 5 fathoms, with Bembridge mill on the highest part of Brading down, bearing W.N.W. ¼ W., and the Dock mill at Southsea on the west end of the large chalk-pit on Portsdown hill, N. b. E. ¼ E.; the latter will serve as a scraping mark for the edge of the shoal in 4 fathoms, should the buoy be removed. A considerable part of the ledge dries at half tide, and terminates in a high and sharp point named Sharpus, at about the third of a mile from the shore; the direction of this point is about S.E. b. E., rather more southerly than the main body of the shoal, and there is not more than 5 feet over its outer extremity, even at high water spring tides.

COLE ROCK and DAWE BANKS.—There are also two very dangerous patches on the northern part of Bembridge ledge, which small vessels must be cautious how they approach. The westernmost patch, called the Cole rock, shows itself at spring tides, and dries in several heads in a N.W. and S.E. direction for more than a cable's length. St. Helens' church tower just open to the westward of St. Helens' sea mark N.W. ½ N. and the face of Culver cliff, showing within Bembridge point between Foreland farm and Foreland village W.S.W., cross the centre of the rock.

The easternmost patch, called the Dawe banks, is a large and irregular shaped shoal about a third of the distance from the Cole rock to the ledge buoy.

It never dries, but there is not more than 8 feet water over its shoalest part St. Helens' church 2 degrees to the northward of the Sea mark N.W., leads to the northward of the Dawe banks and Cole rock; and Chalk Quarry, Black rock watchhouse, and Bembridge point in one, W. ¼ S., to the southward.

The above will be found useful marks for small vessels; for although the latter may be considered as leading full close, they may by not exceeding it be sure of carrying a depth of 2 fathoms at low water. When to the northward of the Cole rock, or when Culver cliff is well open to the northward of Foreland farm, St. Helens' church should be opened more of the Sea mark, to insure clearing the tail of the shoal, which extends some distance to the northward of the rock.

NAB ROCK:—Although the water deepens suddenly into 6 or 7 fathoms to the eastward of Bembridge ledge, yet the rocks soon rise again and extend off to a considerable distance under the name of the Nab shoal, the body of which lies N.W. and S.E., about a mile long and a quarter of a mile broad, having numerous shoal spots of from 25 to 27 feet on it; but that head, which is of very small extent, and known as the Nab rock has only 23 feet over it at low water ordinary springs. From it Bembridge point bears W. ½ N. 1½ miles, Nettlesome point N.W. by N. 3½ miles, and Culver cliff W. ¾ S. $2\frac{8}{10}$ miles. The marks for it are, Lane end farm, which lies a little to the northward of Bembridge point, in one with the centre of the large chalk-pit on Brading down,* bearing W. by N, ½ N., and Nelson monument just open to the eastward of St. Paul's chapel at Southsea, north.

NAB LIGHT. — A light-vessel is moored in 5 fathoms water about 160 fathoms E.N.E of the Nab rock, and exhibits two fixed lights on masts 54 feet apart; that on the mainmast being 38 feet, and that on the foremast 28 feet above the water. A ball is carried at each mast head, and a gong is sounded in foggy weather. The marks for the vessel are, Ashey down tower just open north of Bembridge church W.N.W. ¼ W., and the eastern one of the six clumps of trees on Portsdown hill on with the eastern angle of Cumberland fort N.N.E.

The OUTER NAB is a small patch of foul ground lying 1¼ miles S. b. E. ⅜ E. from the Nab light-vessel, with only 27 feet water over its shoalest part, and 6 fathoms between it and the light-vessel; at low water springs in a heavy sea, it would not be prudent for line-of-battle ships to cross it. Bembridge mill on with the north-east end of Foreland village N.W. b. W. ½ W. points to the 27 feet, and on with the south-west end of the village N.W. b. W. leads to the southward of the patch, and Bembridge church on with Lane end farm N.W. b. W. ¼ W. leads to the northward. The barracks, or the coast-guard houses on the brow of the bank near Sandown castle, on with Culver cliff W. ½ N., leads well to the northward, and also mid-way between it and the Nab shoal.

NEW GROUNDS.—There are several shoal spots of gravel, sand, and broken shells lying to the north-eastward of the Nab, called the New Grounds, which have possibly been heaped up by the meeting of the tides; and indeed between the bearings of North and E.S.E. for 1½ miles from the Light vessel the soundings are very irregular. The New grounds are not dangerous even for line-of-battle ships except at low water springs, when the least water over the shoalest part, which lies rather more than half a mile to the N.E. of the Light vessel, is not more than 27 feet; but as a commendable prudence might induce the careful seaman to avoid them, the best marks for doing so are as follows:—the middle of the six clumps on Portsdown hill in line with the centre of Cumberland fort N. b. E. ⅜ E. leads inside of the outer Nab, or 27 feet patch, very close to the eastern edge of the Nab shoal and east of the shoalest part off the New Grounds; and Ryde church open of Nettlestone point N.W. ¾ W., clears them to the northward.

The LONG ROCK is a considerable extent of foul ground lying to the north-

* Brading Down may be easily recognised by a remarkable single tree near its highest point.

west of the Nab shoal, having several heads on it with from 23 to 25 feet water over them. On the shoalest head of 23 feet, Culver cliff is seen nearly half a point open to the northward of Lane End farm; and the south-east end of the water-mill, a white building on the north side of Brading haven is in line with the north end of the Ferry house, which stands on the shingle point on the same side at the entrance.

St. HELENS ROAD.—This valuable roadstead is well sheltered from all but S.E. winds, with excellent holding ground of mud and stiff blue clay, and calculated for vessels of any draught. The best anchoring marks for ships of the line are, Ashey Down tower on with St. Helens' sea mark bearing W. ¾ N., and Nelson monument on with the eastern part of the trees on Portsmouth lines N. ¼ E. in 7½ fathoms; but vessels drawing less than 16 feet will find it to their advantage to take up an in-shore berth in 4½ fathoms, at about three quarters of a mile from the shore, by running in with Brading down on with the Ferry house at the entrance to Brading haven, until the eastern chalk-pit on Bembridge down is in one with Cliff house, which is the first building near the coast to the north-west of Lane End farm.

DIRECTIONS.—There is a clear and safe channel, as regards depth of water, half a mile in breadth, inside the White buoy of the Princessa, and between the Black buoy on Bembridge ledge and the Nab light vessel, which may prove useful in fine weather and northerly winds to vessels going into St. Helens; but it would not be prudent for a large vessel to take it, except under very favourable circumstances, and with a steady leading wind, for no good turning marks can be given, and as the tides are strong, if caught with light and baffling winds near the ledge, she would be in some danger, particularly as the western stream, when free from the influence of the channel, has a strong tendency to set over that shoal. If the Sussex high land about Chichester is distinct, bring the small plantation on the eastern shoulder of Rooks hill in line with the Nab light vessel bearing N.E. b. E. ¾ E., which will lead through the channel in not less than 5 or 5½ fathoms at low water; but as the Nab rock lies in this track, care should be taken in vessels of great draught, when abreast of Bembridge ledge buoy, to haul to the northward when Nelson monument is in one with the east end of the trees on Portsmouth lines bearing N. ¼ E., which will lead between the rock and the ledge.

This channel should never be attempted at night; but if circumstances render such a step unavoidable, bring the light to bear N.E. b. E. ¾ E., and steer for it on that bearing until Culver cliff bears W. ¼ N., and Bembridge point N. b. W. ¾ W., when the course should be altered to E. ¼ N., to avoid the Nab rock, making a proper allowance for the tide; the lead will be found serviceable in approaching the rock, by not standing into less than 7 fathoms until the light bears N.E. b. N., after which steer E.N.E. when the water will quickly shoal from 6 to 5 fathoms; when the light bears N. b. W. ¼ W., the light vessel may be rounded at any convenient distance.

Large vessels, in turning into St. Helens' road, should not stand farther to the southward than to have Foreland farm on with the eastern chalk pit on Bembridge down, which clears the Nab shoal and New grounds; nor farther to the northward than the summit of Brading down on with St. Helens' sea mark, which clears St. Helens' patch.

In running for the road at night, a vessel, when to the northward of the Nab light, should not bring it to the eastward of S.S.E., which bearing should be kept on with the lead going until Dunnose is shut in with Culver cliff, or until Bembridge point, which is almost certain to be seen, bears S.W., when she may anchor in from 6 to 8 fathoms.

In turning in to the road at night, and having the Nab light to the southward of W. b. S. ½ S., a vessel should, when standing over to the eastward, go about as soon as the water deepens to 10 fathoms, which will be a sufficient warning of her approach to the Dean Tail: but as that depth runs out a very little to the eastward of this bearing, she must be careful that the light is not to the westward of it in depending upon a deep cast for her guide. On the other hand, great

caution must be used not to get too far to the westward, as she may be nearing the Warner; Bembridge point if seen, bearing S.W., is quite far enough; but as the water deepens to 14 fathoms in the fair-way as that shoal is approached, one cast of this depth must put her rigidly upon her guard.

BRADING HAVEN offers no refuge except for vessels of the smallest class, although at high water springs it assumes rather an imposing appearance. From the shingle points at the entrance the sands dry at low springs to a considerable distance out. The bank on the southern side of the entrance is composed of sand and gravel, and extends for nearly three-quarters of a mile in a N.E. direction. Its highest part, which lies near the edge of the channel, has only 6 feet over it at high water, and is marked by five fragile beacons to be left on the port-hand in entering; the outer one, which is abreast of the bar, is surmounted by a basket. The bank on the northern side from the base of St. Helens' sea mark uncovers for about half a mile, and is thickly interspersed with large stones and masses of rock. A small beacon buoy marks the outer end, and must be left on the starboard hand in entering.

A bar of sand, gravel, and stones dries across between the extremes of these points, the water leaving it half an hour before the tide has ceased falling by the shore, being about a foot above the low water level; 12 or 13 feet may, however, be carried over it at high springs. The channel is very narrow, and not even navigable for boats at low water. Within the high water points a few small vessels of 5 or 6 feet draught may lie afloat in a small hole on the southern side. At low water the Haven is little more than an extensive bank of bare mud, with a few patches of sand and gravel, carrying a depth over most of them of not more than 3 or 4 feet at high springs, and remaining uncovered at neaps.

A narrow intricate channel leads up to a small jetty at the head of the Haven, called Brading quay, where the vertical rise at springs is only 9 feet. It is high water at this quay the same time as outside, but it does not commence rising for 2½ hours after the flood has made at the entrance. Near the bar it is high water, full and change, at $11^h\ 20^m$; vertical rise, 14 feet.

Channels to Spithead and into Portsmouth Harbour.

ST. HELENS PATCH.—The channel into Spithead is bounded by St. Helens' patch, the Warner, No-mans land, and Ryde sand to the S.W., and by the Dean and Horse sands to the N.E.

The southern shoals commence near Brading haven, where a bank extends E.N.E. 1½ miles from St. Helens' sea mark, at which distance there is about 26 feet water, rapidly falling into 10 and 11 fathoms. A small bank of gravel and stones, called St. Helens' patch, lies about half a mile within its outer edge, with only 17 feet over it at low water, and 21 and 22 feet on its western side. Ryde church, just shut in with Nettlestone point N.W. ½ W., and the coast guard mast on the southern side of Brading haven in a line with the eastern chalk-pit on Bembridge down S.W. ¼ W., lead over it. St. Helens' sea mark on with the summit of Brading down W. ½ S., leads to the southward; and Ryde church open of Nettlestone point N.W. ¾ W. to the northward. Large ships working up for the Warner should not stand towards it into less than 10 fathoms water.

The WARNER is a small bank of hard sand and gravel, with shells, about 2 cables in length, in a N.N.E. and S.S.W. direction, and half a cable broad. It has a depth of only 16 feet over its shoalest part, and forms the south-east and No-mans land the north-west end of the obtuse termination of the bank which extends from Nettlestone point, and which contributes in so important a degree to the defence of Spithead in southerly gales. On its north-eastern side it is very steep-to breaking down from 17 feet to 11 fathoms, at a little more than 30 fathoms distance from its edge. St. Helens' patch bears from it S.W. ¼ W. 1 mile, and Nettlestone point W. ¾ N. rather more than 1½ miles.

A LIGHT VESSEL is moored in 13 fathoms low water springs on the south-west side of the channel which separates the Warner shoal from the Horse sand, and exhibits a revolving light showing a bright flash every minute, and is

visible in all directions. The vessel lies with St. Helens' water mill half its breadth open of St. Helens' sea mark, bearing S.W. b. W. ½ W.; outer end of Ryde pier, seen between the towers of Osborne, N.W. b. W.; No-mans land buoy N.W. by N. 1½ miles; Horse Elbow buoy N.E. ¾ N. two thirds of a mile; Dean tail buoy E.S.E. 2½ miles, and the Nab light vessel S. ¾ E. 2½ miles.

The NO-MANS LAND is a bank lying N.N.W. rather more than a mile from the Warner, but of much greater extent, and infinitely more dangerous, as it has a depth of only 7 or 8 feet near the eastern end, with an average depth of 9 feet over every part of it at low water. Its eastern edge is very steep-to, the lead dropping at once from 8 or 9 feet into 16 fathoms, and unlike the Warner there is no channel between it and the island, not even for the smallest vessel at low water springs. The surface of the bank is principally gravel and shells, but so hard as to render it dangerous for vessels grounding upon it; between it and the island the ground changes its character to mud and weed.

The eastern point of the bank is marked by a white buoy lying in 38 feet water, which bears from the Warner N.W. b. N. $1\frac{1}{10}$ miles. The marks for it are, Ashey down tower on with the north-west angle of a remarkable triangular field half a mile to the north-west of Nettlestone point bearing W.S.W. ½ W.; the gap in the fir gardens on Portsdown hill on with St. John's chapel in Portsea N. b. E. ¾ E., and St. Paul's chapel in Southsea in line with the large chalk pit on Portsdown hill N.N.E. Kickergill tower on with the west end of the barracks in fort Monkton is a good clearing mark to lead to the eastward of the bank; but a vessel approaching its eastern edge must on no account open Nelson monument of the eastern side of the entrance to Portsmouth harbour.

RYDE SAND. — From Nettlestone point the sands uncover at low springs for nearly 1½ miles in a due north direction, and from thence they turn away W.N.W. towards the outer end of Ryde pier. A chequered Red and White buoy is placed at the Sand-head in 3 fathoms, the No-mans land buoy bearing S.E. b. S. 1½ miles. This extensive flat, called the Ryde sand, must be carefully approached, as its outer edge is very steep, and although vessels may safely stand towards it into 10 fathoms water, they must on no account pass to the southward of the buoy; Quor house in one with the end of Ryde pier W. ¾ N., leads to the northward.

HORSE AND DEAN SAND.—This extensive shoal, to the existence of which the invaluable roadstead of Spithead is mainly indebted for shelter from the violent effects of S.E. gales, is composed of a coarse sand mixed with gravel and broken shells. It is quite flat, having very little water over any part of it; from 6 to 9 feet may be taken as an average depth over the shoalest parts, and were it not for the excellent system of buoys, it would be a very dangerous bank; but in day-light with anything like clear weather, it is utterly impossible to err with the most ordinary attention, although it must be carefully remembered that the outer edge in some parts is very steep, particularly between the Horse and Horse Elbow buoys.

HORSE BUOY (Black). — From Southsea castle, at the foot of which the Horse and Dean commences, its direction is about S. b. W. for nearly 2 miles, where a buoy is laid down in 30 feet water, but so close to the edge of the shoal that as little as 12 feet will be found at half a cable's length within, and 12 fathoms 700 feet outside of it. The marks for the buoy are, Ashey down tower on the south-west corner of the triangular field near Nettlestone point, W.S.W. ½ W.; Kickergill tower on the north-east angle of fort Monkton N.N.W. ½ W., and the No-mans land buoy W. b. S. nine-tenths of a mile.

BOYNE BUOY (White). — Between the Horse buoy and Southsea castle, a buoy is placed near the wreck of the Boyne in 30 feet water, to mark the western edge of the horse sand, and must always be left to the eastward. The marks for it are, the east Swatchway beacon half way between St. John's chapel and the east end of the trees on Portsmouth lines N. ½ E., and the Dock mill in one with the London road over Portsdown hill N.E. ½ N.

HORSE ELBOW BUOY (Black). — From the Horse buoy the shoal trends rather abruptly to the S.S.E., and at three-quarters of a mile from it is placed a

buoy, which with the Warner light-vessel bearing from it S.W. ¾ S., two-thirds of a mile, marks the narrowest part of the channel into Spithead. Here also the bank is steep-to, the buoy lying in 30 feet water within a cable's length of the depth of 10 fathoms. The marks for the buoy are, Kickergill tower on with the north-east corner of fort Monkton bearing N.N.W. ½ W.; the east end of the trees on Portsmouth lines a tangent to the east side of the tower of Southsea castle north, and Lumps mill on the east end of the large chalk-pit on Portsdown hill N. b. E. ¼ E.

DEAN BUOY (Black).—From the Horse Elbow the shoal alters its direction to about S.E., and continues straight for 2 miles, when it gradually disappears. This part of the bank is known as the Horse Tail, and the three buoys which mark its edge are called the Dean buoys. The first buoy to the eastward of the Horse Elbow, named the Dean, bears from it S.E. ¾ S., rather more than six-tenths of a mile, and lies in 6 fathoms, about a cable's length from the edge of the shoal. The marks for it are, Hayling church on with the east end of the trees at Kingly bottom N.E. b. E. ½ E., and the Dockyard semaphore in line with the N.W. corner of Southsea castle N. ¾ W.

The DEAN ELBOW BUOY (Black) lies S.E. b. E. about eight-tenths of a mile from the Dean buoy, in 27 feet water, rather nearer the edge of the shoal, and marks pretty accurately the spit or eastern extreme of the Horse Tail. The marks for it are, the officers' houses in Cumberland fort on the second clump of trees to the westward of the six clumps on Portsdown hill N. b. E. ¾ E., and Ashey down tower on the southernmost of the two clumps of trees at the Priory house over Horestone point West.

The DEAN TAIL BUOY (Black), in 27 feet water, is the outer and eastern-most buoy on this side of the channel into Spithead, and is laid down as much for the purpose of marking some foul ground near it, as a warning of approach to the shoal. The marks for it are, the windmill on Portsdown hill on the eastern part of the officers' houses in Cumberland fort N. ½ E., and Culver cliff on the outer shoulder of Dunnose W.S.W. The Dean Elbow buoy bears N.W. b. W. ½ W. nine-tenths of a mile, the Warner light vessel W.N.W. 2⅓ miles, and the Nab light vessel S.W. ½ W. 2¼ miles.

ANCHORAGE.—The limits of the best anchorage at Spithead are Southsea castle N.E. to E. b. N., and Gilkicker point N.N.W. to N.W. A good berth for large ships is with Portsdown windmill on the end of the trees on Portsmouth lines N.E. ¼ N. and Kickergill tower on the western end of Monkton barracks N. b. W. ¾ W. in from 10 to 12 fathoms water; but small frigates and vessels of light draught may berth themselves nearer to the Spit sand, in about 7 fathoms, care being taken not to open Kickergill tower of the east end of the barracks. Vessels moored should have open hawse to the southward.

DIRECTIONS from the WESTWARD.—From abreast of Dunnose to abreast of the black or south-east buoy of the Princessa the course and distance will be E. b. N. 6½ miles varying according to the direction of the wind and set of the tide. In approaching the Princessa keep the red clay cliff, which is the next westward of Culver cliff, open to the southward of the latter, until the western-most chalk-pit on Portsdown hill opens to the eastward of the tower of Southsea castle, bearing N. ½ E., by which marks the Princessa will be avoided. Or in approaching the Princessa from Dunnose the white gable of a small farm house (Red Hill farm), having a plantation near it, should be brought in one with the shoulder of Appuldercomb hill bearing W. ¼ N., which will clear the southern edge of that shoal; and when Brading Down is seen clear of Bembridge Down, which mark scrapes its south-western edge, the vessel may be hauled gradually to the northward until the above farm is brought half way between the shoulder and Worsley obelisk, and as soon as Bembridge church (the spire of which will be seen over the trees) comes on with Foreland farm N.W. ½ N., she will be to the eastward of the shoal. When the middle of the six clumps of trees upon the eastern part of Portsdown hill come in one with the centre of Cumberland fort, bearing N. b. E. ¾ E., run in with them in that direction, which will lead to the westward of the outer Nab, or 27 feet patch, very close to the eastern edge of the

Nab shoal, to the eastward of the shoal part of the New Grounds, and up to the line of the leading mark into Spithead, which is Kickergill tower on with the middle of the barracks in fort Monkton bearing N.N.W. When the large chalk-pit on Portsdown hill comes on with Southsea castle, a vessel will be to the westward of the Horse, and may take any berth at Spithead that convenience may suggest. In this track she will pass to the eastward of the Princessa buoys (black and white); Bembridge buoy (black); Nab or Bembridge light vessel, which carries two Fixed lights; the Warner light vessel, which exhibits a Revolving light and No-mans land buoy (white); and to the westward of the five black buoys of the Dean and Horse, each of which has its name painted on the head.

At about half a mile outside of the Princessa a pretty equal depth of from 7 to 8 fathoms will be maintained, the nature of the bottom being very changeable, but generally gravel and broken shells, interspersed with numerous patches of foul ground. Nearly abreast of the Nab, and from thence to the New Grounds, less water may be expected, and even an occasional cast of as little as 5 fathoms, but almost invariably gravel and broken shells.

If it be intended to pass to the westward of the Nab light vessel, Nelson monument on with the east end of the trees on Portsmouth lines, bearing N. ½ E., will lead up to the leading mark into Spithead; but although a depth of 27 feet may be relied on between the Nab and Long rock, yet the seaman must be cautioned that the above useful leading mark passes over the east end of the Princessa in 25 feet.

From the EASTWARD.—From the west end of the Boulder bank, the south-east buoy of the Dean bears N.W. ¼ N. 7¼ miles, and from half a mile south-westward of the bank the direct course between the Dean and Warner sands is about N.W., but, in approaching the south-east part of the Dean, if the buoy is not seen, Ashey Down tower should not be brought to the northward of St. Helens' sea mark until the six clumps of trees on Portsdown hill come on with Cumberland fort N. b. E. ¾ E., when a vessel will be in the fairway to Spithead; and it should be carefully remembered that the vessel is upon the threshold of the dangers as soon as she is abreast of the Dean Tail buoy, and of this position she will have ample notice by observing when Dunnose comes on with, or is about to be masked by Culver cliff. A reference must be made to the foregoing remarks for the necessary precautions against the dangers on the Isle of Wight side, and there is no better guide for the Horse and Dean sand than a strict attention to the lead in conjunction with the cross marks for the buoys, which every seaman would do well to make himself acquainted with.

In turning to windward a vessel should not stand between the Dean Tail and Dean Elbow into less than 7 fathoms, and between the Dean Elbow and the Dean the same depth may be observed until within a quarter of a mile of the latter, when not less than 9 fathoms ought to be depended upon. From thence the seaman must exercise his utmost vigilance as having approached the narrow part of the channel with deep and dangerous shoals on both sides. To the westward of the Dean buoy, as far as the buoy of the Horse, the sand should not be approached into less than 15 fathoms.

Large vessels in turning into St. Helens' road should not stand farther to the southward than to have Foreland farm on with the eastern chalk pit on Bembridge down, which clears the Nab shoal and New grounds; nor farther to the northward than the summit of Brading down on with St. Helens' sea mark, which clears St. Helens' patch. The general mark given for sailing outside the Warner is Kickergill tower on the west end of the barracks in fort Monkton, and the same tower turned from end to end of the barracks in the fort to clear the shoals on both sides; but in a large vessel the tower must not be brought to the extreme end of the barracks, which would be attended with danger, but should be kept about twice its own breadth within the end until she is at least two cables' lengths to the northward of the light vessel, when the tower may safely be brought on the west end of the barracks, taking care that the water is not shoaled to less than 15 fathoms at low water, which will be a good and safe guide until past the

No-mans land. The tides ought to be strictly attended to when turning to windward near these shoals.

Although 15 fathoms is a good guide for a vessel working into Spithead from the Warner to the No-mans land, and abreast of these shoals nothing less is safe; yet having passed to the westward of the No-mans land buoy, she may safely stand in to 10 fathoms, which will be found a good turning mark the whole way up to the east end of the Sturbridge. The tides at No-mans land are the same as at the Warner.

Small vessels may with safety sail over any part of the Warner, and there is a good channel of 19 feet to the westward of the shoal, and more out of the tide. The leading mark through is, Southsea castle on with the east end of the large chalk-pit on Portsdown hill N.N.E. As the water deepens considerably to the westward of the Warner, small vessels may take advantage of it in working up to Spithead; but it will not be prudent to stand farther in, than to have Nelson monument on the east side of the entrance to Portsmouth harbour N. b. E., which mark, as No-mans land is approached, will be found to lead very close to that shoal.

As the tide runs with considerable velocity at springs through the channel into Spithead, cutters and vessels of very small draught will find it frequently to their advantage to run over the Horse sand, and not confine themselves to the fair-way; but when this is done, the rise of the tide should be carefully considered. From half flood to half ebb a vessel not exceeding 12 feet draught may borrow on the Horse sand as long as Blockhouse fort is open of Southsea castle; and if under 9 feet draught she may do so from quarter flood to three quarter ebb, as the shoalest water outside of this line at springs is about 7 feet.

AT NIGHT.—In approaching the southern edge of the Princessa, a vessel of large draught should not stand into less than 10 fathoms, until the Nab light bears North, after which a N. b. E. course may be steered, to avoid the eastern prong of the Nab shoal, and which will lead about three quarters of a mile to the eastward of the Nab light vessel, if uninfluenced by the tide (vessels of lighter draught and easy management may steer for the light on a N. b. E. bearing, and pass it to the eastward at any convenient distance). When the light bears S.W. b. W. or the Warner light N.N.W. ½ W. she will be in the fair-way either for Spithead or St. Helens' road; from thence steer for the Warner light, and after passing a third of a mile or less to the eastward of the light vessel, haul gradually to the westward till the Warner and Nab lights are in one bearing S. ¾ E. when a N.N.W. course may be steered for Spithead; or when the lights are in one, steer with them on that bearing which will lead between the Horse and No-man's land, and when the Red light in Southsea castle is seen the vessel will be to the westward of the Horse, and when bearing about N.N.E. ½ E. she may anchor at Spithead in from 6 to 15 fathoms, edging out or in as convenient.

Southsea castle Light is elevated 51 feet above high water, and appears strong Red when the channel between the Spit and Horse buoys is open, but Green when to the westward of the Spit buoy, the bearing of the line of division between them being about N.E. b. N. and S.W. b. S., or in the direction nearly of the Spit buoy; to the eastward of the Horse it is invisible. When coming from the eastward it is first seen when bearing N. b. E., and is of a faint Red colour; on that bearing it will lead about 100 fathoms to the westward of the Horse buoy, and will nearly hit the Boyne buoy.

ENTRANCE TO PORTSMOUTH HARBOUR.—It is not customary for Her Majesty's ships to sail in or out of Portsmouth harbour without a pilot, neither is it prudent that any large ship should do so; but in small vessels such assistance is not absolutely necessary, if an ordinary attention is paid to the buoys, and a careful perusal of the following directions.

EAST SAND.—The channel into the harbour is confined between the Spit sand and the Southsea beach; the latter, with the exception of the shoal off the Castle point, is steep-to, and may be approached within 300 feet without danger till abreast of the bar, where the channel is considerably narrowed by a bank of sand and gravel, named the East sand, which commences at the mouth of the

harbour, and running parallel to the beach, terminates in a spit very nearly as far to the southward as the Swatchway beacons. The general depth of water on this sand varies from 7 to 10 feet; but a shoal patch named the East Knoll lies a little to the northward of the baths, or about half a cable's length from the beach, with as little as 5 feet over it at low water. A deep gut called Southsea pool runs up inside the East sand, or between it and the beach, having 6 or 7 fathoms at its entrance; but it offers no channel into the harbour, as it gradually narrows into a point, and decreases in depth as its northern end is approached.

Three white buoys, numbered 1, 2, and 3, mark the western edge of the East sand, which must be left on the starboard hand in entering, No. 1 being the southern or outer buoy.

The SPIT SAND, so formidable in appearance, but in fact the valuable protection to this important port, is an immense accumulation of coarse calcareous sand and gravel, thickly mixed up with minutely broken shells. No natural formation of rock is found near the surface, but there are numerous patches of large stones the whole way along the Hospital beach, probably from the destruction of the neighbouring Government works during heavy gales, and partly, it is to be feared, assisted by the negligence of those employed in their construction. The shape of this sand somewhat resembles a cone, the base of which rests upon Haslar beach, and occupies the whole distance from fort Monkton to the Blockhouse, the apex or spit extending off very nearly 1½ miles in a line perpendicular to its base. The general depth of water over it is from 7 to 10 feet, but some shoal spots, which nearly dry at springs, are very dangerous for small vessels, and deserve a particular notice.

The Hamilton Bank dries in spots at very low tides, and carries a depth of only 5 feet water over the outer end of it, which is half a mile from Haslar beach. The following useful marks will avoid the shoalest parts:—In running towards the harbour from the southward, keep the dockyard Semaphore over the Round tower which stands on the eastern side of the entrance to the harbour, which will insure 6 feet at low water to the eastward of the bank. In entering from the westward keep a new white stuccoed house near the Fire Barn, which has a wall round it and stands on Southsea common, in one with the Dock mill, until the Semaphore comes on with the Round tower, which clears its outer end. The tall chimney in Bingham town at the back of Gosport shut in with the eastern part of Haslar hospital, leads along its western edge in 6 feet water; and the Round tower on with the Gun-wharf clock leads up in-shore of the dry spots with not less than 4 feet at low water springs—a very useful mark for small steamers at a proper rise of tide.

The Swatchway beacons on Southsea beach in line will lead in a straight course over the Spit sand; but as this mark would carry a vessel very close to a shoal spot on that part of the sand called the Elbow, deeper water may be insured by keeping the beacons in line only until the small white Obelisk on the beach a little to the southward of the baths comes on with the east end of the trees on Portsmouth lines, which will insure into the channel about 7 feet at low water.

A very dangerous shoal, composed of hard coarse sand, called the Ridge, nearly 500 feet in length and not broader than a boat, lies near the outer end of the Spit sand, and has only 3 feet over it at low water ordinary springs. The double brick-kiln at Southsea just touching the southern part of the tower of Southsea castle, and the large chimney in the victualling yard over the eighth port-hole from the western end of Blockhouse fort lead over it; the brick-kiln well open to the southward of the castle, leads to the southward, and the kiln open to the northward of the castle, to the northward. To sail to the westward of it, run in with the chimney in the victualling yard in one with the mast in Blockhouse fort until the mark for clearing the eastern edge of the Hamilton bank comes on.

A shoal patch of gravel and stones called the Harrow Bank, which nearly dries at low water, lies about 2 cables' lengths from the beach near fort Monkton, and much in the way of small vessels coming round Gilkicker point, or crossing over from Ryde. St. Paul's chapel at Southsea in one with the King's bastion flagstaff leads more than a cable's length to the southward of it.

With attention to the above marks, and an accurate knowledge of the state of the tide, so easy to be obtained by a reference to the tide table, the Spit sand is really not so dangerous for small vessels as is generally supposed.

HARBOUR CHANNEL.—The entrance to the Harbour channel between the end of the Spit and the beach under Southsea castle is at least a quarter of a mile broad, but continues so only for a very short distance, being soon intercepted by a considerable projection from the main body of the Spit sand called the Elbow, which is detached at its outer end only by a deep gut or blind channel.

BUOYS ON WESTERN SIDE.—There are no buoys to mark the western edge of the Spit sand, but the channel or eastern side of the sand is clearly pointed out by five Black buoys. The outer one is called the Spit buoy beacon, and the others are numbered from 1 to 4, commencing from the S.E.

The Buoy Beacon* on the extremity of the Spit sand is moored in 22 feet water, but there is no channel between it and the Spit. From the Beacon, the eastern or inner Swatchway mark appears half way between St. Paul's chapel and the west end of the large chalk-pit on Portsdown hill, bearing N. b. E. ¼ E., and the Dock mill in one with Portsdown semaphore, N.E. ½ E. No. 1 lies near the S.E. point of the Elbow in 30 feet, No. 2 upon the inner shoulder of the same bank in 12 feet, and Nos. 3 and 4 very nearly in a straight line between No. 2 and Block-house point in 15 and 18 feet water respectively, the whole clearly and accurately marking the west side of the Harbour channel.

BUOYS on EASTERN SIDE.—Three White buoys, numbered 1, 2, and 3, mark the western edge of the East sand, which must be left on the starboard hand in entering, No. 1. being the southern or outer buoy.

The BAR is formed by a high gravel bank which connects the eastern edge of the Elbow with the outer Spit of the East sand, and carries a depth of only 12 feet over it at low water springs. It is about a quarter of a mile in breadth from north to south, and its edge is steep-to on both sides.

The channel is very narrow on the bar, but its limits are well defined in entering by the four buoys, viz., Nos. 1 and 2, white, on the starboard hand, and Nos. 2 and 3, black, on the port side. The mark for leading through in the deepest water is. the Bar beacon (on Block-house point) in one with the Bar mark, which is painted black on the eastern end of the face of Blockhouse fort.

GENERAL OBSERVATIONS.—It must be taken as a general rule, that it is utterly useless to attempt entering Portsmouth harbour against the tide, except with a commanding breeze or with steam, nor should a vessel venture to work into the harbour without a pilot. In sailing in with the tide, particularly at its strength (at springs it runs 4 knots), the utmost caution must be used; for what with the generally crowded state of the harbour, the constant crossing of the steam bridge, and the numberless boats continually in the vessel's track, it is always attended with great anxiety and some risk. The best time for entering is near slack water, about half an hour before high water, or upon the slack, which occurs between the 2nd and 3rd hours flood, which continues for about three quarters of an hour. The flood is strongest between the 5th and 7th hours and the ebb at the third hour.

On a flood tide in a small steamer, or with a slant of wind in a sailing vessel, it is perhaps best to run well up the harbour past the thick of the shipping, and then turn the vessels head upon the tide, which will afford time and give facility for taking up a berth; but upon the ebb the vessel may steer direct for her intended berth. Under all circumstances it cannot be too strongly impressed that judicious and moderate sail, a steady and attentive helmsman, with an anchor in constant readiness, are the best precautions in entering the harbour.

TIDES.—At the needles it is high water, at full and change, at $9^h\ 46^m$; in Freshwater bay, about 1 mile S.W. of Brook point, and the same distance off Atherfield point, the western stream makes at $10^h\ 25^m$ and runs at the rate of

* Peacock's refuge buoy.

1 knot, and the flood or eastern stream at $2^h\ 35^m$, from 2 to $2\frac{3}{4}$ knots; both streams take the direction of the coast. W. b. S., $4\frac{1}{2}$ miles from St. Catherine point, the western stream makes at $11^h\ 0^m$, setting N.W. $\frac{3}{4}$ W., and the flood or eastern stream at $5^h\ 0^m$, in the opposite direction S.E. $\frac{3}{4}$ E., the rate of both being from 2 to 4 knots; but at 1 mile W. b. S. from the point the stream sets N.W. b. N. and S.E. b. S., 3 to 4 knots, and at two thirds of a mile S.S.W. of the point, W. b. N. and E. b. S., with the same velocity.

Nearly 5 miles S.S. E., of Dunnose, at full and change, the stream turns at $10^h\ 40^m$, and $4^h\ 30^m$ and sets E. $\frac{1}{2}$ S. and W. b. N.; velocity, from 4 to 5 knots; but S.E. 2 miles from Dunnose, the flood sets E. b. N., and turns at the same time as the Portsmouth harbour, and the ebb W. b. S., but one hour earlier than it does in the harbour.

At Bembridge point it is high water, at full and change, at $11^h\ 0^m$; rise at springs 14 feet, at neaps $6\frac{1}{2}$ feet.

At the N.W. buoy of the Princessa shoal, at full and change, the western stream makes at $10^h\ 0^m$ and runs six hours W.S.W. $\frac{1}{2}$ W. The eastern stream commences at $4^h\ 0^m$, and sets very nearly in the opposite direction, E.N.E. At the S.E. buoy the tides are about half an hour later, and set as follows: viz., the western stream first part, W. $\frac{1}{4}$ S., gradually becomes more southerly, and at the last of the tide runs S.W. b. S. The course of the eastern stream is pretty nearly the same throughout the whole of the tide, E. b. N.

At the Nab light vessel, the tidal stream is nearly rotary, which is probably caused by the Spithead tide meeting the tide round Dunnose somewhere near the light vessel; for instance, at the 1st hour's flood by the shore it sets E.; 2nd and 3rd hours, E.N.E.; 4th, N.E., 5th, N.E. b. N.; 6th, North; 7th, N.N.W. to N.W.; and the last drain of the flood, N.W. b. W. The 1st hour's ebb sets W. b. N.; 2nd, W. b. S. to W.S. W.; 3rd, S.W. b. W. to S.W.; 4th, S.W. $\frac{1}{2}$ S., the first part of the 5th hour, S.S.W., gradually trending to the southward until low water by the shore, when it sets S.E. There are only a few minutes slack. At full and change, the eastern stream makes at $8^h\ 30^m$, and the western stream at $12^h\ 15^m$.

At the Warner, at full and change, the eastern stream makes at 2 o'clock, and runs $7\frac{1}{2}$ hours about S.S.E.; and the western stream at $9^h\ 30^m$, and runs nearly $4\frac{1}{2}$ hours N.N.W.

Near the Horse Elbow, the tide must be strictly attended to, for in many cases it sets directly over that shoal. The eastern stream makes at $2^h\ 0^m$, $2\frac{1}{2}$ hours after the tide on the shore, and runs to the S. E. $7\frac{1}{4}$ hours; the western stream makes at $9^h\ 15^m$, $4\frac{3}{4}$ hours after low water on the shore, and runs nearly 5 hours to the N.W.

At the Dean Elbow, at full and change, the eastern stream, which sets over that shoal, makes at 2 hours, runs to the S.E. for 2 hours, and then sets east for the remainder of the tide, $5\frac{1}{2}$ hours; the western stream makes at $9^h\ 45^m$, and runs W.N.W. $4\frac{1}{4}$ hours.

At Spithead, at full and change, the eastern stream makes at 2 hours, about $2\frac{1}{2}$ hours after high water in the harbour, and runs 7 hours S.E. b. S.; and the western stream at 9 hours, about $2\frac{1}{4}$ hours before high water in the harbour, and runs 5 hours N.W. b. N.

In Portsmouth harbour the flowing continues about 7 hours, and a narrow stream runs in 15 or 20 minutes after high water at the Dockyard, where, from the mean of six years' observation, it is high water at full and change at $11^h\ 41^m$; rise at springs 12 feet 7 inches, at neaps 6 feet 5 inches.

Inner Channel of the Isle of Wight, through the Needles Passage, &c., including Southampton Water.

RYDE MIDDLE is a bank composed of mud and gravel, and sands and shells, lying between Stokes bay and Old Castle point, and extends about 2 miles in a N.W. b. W. and S.E. b. E. direction. The least water on it is 2 fathoms, with

a depth of 6 fathoms on either side. A Black buoy is placed on each extremity of the bank, that on the western end lies in 29 feet water close to the westward of a 15-feet patch, and that on the eastern end in 18 feet.

The STURBRIDGE shoal lies midway between Ryde and Gilkicker point, and extends about two thirds of a mile in a N.W. ½ W. and S.E. ½ E. direction, with only 16 feet on it at low water. A White buoy marks each extremity of the bank; the western buoy lies in 21 feet water, and the eastern buoy in 19 feet, and bears N.W. 1⅓ miles from the No-mans land buoy.

PEEL and MOTHER BANKS.—In the deep bight formed between Old Castle point and Ryde lie the Peel and Mother banks, which extend 4½ miles in a S.E. b. E. direction from Old Castle point, and terminate to the eastward in two spits, of which the inner one lies within the Sturbridge shoal, but the eastern edge of outer spit in 3 fathoms lies W.N.W. two thirds of a mile from the western extremity of that shoal, with Kickergill tower in line with the western edge of the large chalk pit on Portsdown hill bearing N.E.

The depths on these banks vary from 1½ to 2½ fathoms at low water, with 5 fathoms on their outer edge, which abreast of Wotton creek is about 1¼ miles from the shore, and 7 to 10 fathoms between the Outer and Inner spits at the Sturbridge. A White buoy is moored in 20 feet water on the northern edge of the Peel bank abreast of Kings quay creek at about a mile from the shore, and bears W.S.W. three quarters of a mile from the east buoy of the Middle.

The Quarantine ground lies to the N.N.W. of the town of Ryde, and its limits are marked by seven buoys, the outermost of which are a mile from the shore. The deep water is near the Lazaretto, where there are 4 to 5 fathoms at low water. Merchant vessels in pratique generally anchor between the outer and inner spits of the Mother bank and the Sturbridge in from 5 to 11 fathoms water over clean and good ground, sheltered from southerly winds, with Ryde bearing from S.W. to S.S.W.

DIRECTIONS.—In proceeding to the westward from the anchorage at Spithead, and intending to go to the northward of the Middle, steer about N.W. into Stokes bay until the tower or flag-staff of Southsea castle appears well open to the northward of Monkton fort, bearing S.E. b. E. ¾ E.; with this mark on, proceed between the Middle and Bramble till abreast of Egypt point, when Hurst castle will bear West, 9½ miles.

If intending to go to the southward of the Middle, steer N.W., as before, until Egypt point just shows open of Old Castle point, bearing N.W. b. W. ¾ W. Steer with this mark on, taking care when to the westward of the east buoy of the Middle not to keep Egypt point open of Old Castle point, for fear of getting too near that shoal, but keep them alternately open and shut till the west buoy of the Middle bears about N.N.W., then steer N.W., or more northerly (to avoid the ledge off Old Castle point) till Egypt point bears W. ½ N., then W.N.W. till abreast of it.

Turning to windward to the northward of the Middle, stand towards the Sturbridge and Gilkicker point to 8 fathoms water, the Mother bank to 7 fathoms, Stokes bay to 9 or 8 fathoms, the Middle to 7 fathoms, and towards the shore to the same depth: but no nearer the Bramble than 9 fathoms, nor Old Castle or Egypt point than 8 or 7 fathoms. Working to the southward of the Middle, stand towards the Mother and Middle banks to 7 fathoms.

EGYPT POINT is bold on its northern face, and may be passed at the distance of a good cable's length.

COWES ROAD and HARBOUR.—Cowes road is a safe anchorage, much used by yachts and merchant vessels waiting orders. The usual anchorage is in from 5 to 7 fathoms water, with Cowes castle bearing W. b. S. ½ S., and the sea mark on Old Castle point S.E. Pilots are always here in attendance to conduct vessels into Cowes harbour or Southampton water, and strangers bound to these places would do well to avail themselves of their assistance.

Cowes harbour has from 9 to 14 feet in it at low water. A buoy marks the spit at the eastern point of the entrance, and the channel, which is on the west

side of the buoy is half a cable wide, but the tide runs in it with great strength. The tide flows into the harbour 7¼ hours, and ebbs about 4½ hours.

Cowes is a place of great resort for bathing and yachting, and has considerable trade; large building yards and dry docks, capable of docking the largest merchant steamers. The registered tonnage of the port in 1847 amounted to 9,259 tons, and the population in 1851 was 4,786.

OLD CASTLE POINT.—A White buoy is moored in 4 fathoms to the eastward of Cowes road, and marks the edge of the shoal off Old Castle point.

The BRAMBLE is a large and dangerous sand bank lying at the entrance to Southampton water, and is marked by four buoys, viz., a Red ball buoy in 25 feet water at the north-west angle; a Red buoy in 26 feet at the south-west angle; a White buoy in 25 feet at the south-east angle; and a Chequered buoy in 17 feet at the north-east angle of the shoal. The centre of the highest knoll of this bank, which dries at low water, lies about a third of a mile to the E.S.E. of the Red ball buoy, and the east knoll, which has only 5½ feet on it at the same time of tide, lies N. ¾ W. a good half mile from the White buoy at the south-east angle of the shoal, in the line for Calshot light vessel. Along the southern edge of the bank are 3 fathoms water, at 2 cables' lengths 8 fathoms, and in mid-channel, between it and Cowes road, 11 and 12 fathoms.

CALSHOT SPIT.—An extensive shoal runs off from Calshot castle, forming a channel between it and the Bramble, carrying from 5 to 10 fathoms at low water. A Black buoy is moored on the south-eastern edge of the shoal, at a mile S. ½ E. from the castle, and a Black buoy marks its eastern edge at nearly 4 cables' lengths S.S.E. ¾ E. from the castle.

CALSHOT LIGHT.—A light vessel is moored within the Bramble in 3½ fathoms water, S.E. ½ S. 1½ miles from Calshot castle, and exhibits a light which revolves every minute at 31 feet above high water. The vessel, which has only one mast and is painted Red, with Calshot on her sides, carries a Ball at her mast head during the day, and a Gong is sounded in foggy weather.

SOUTHAMPTON WATER forms one of the finest harbours in the kingdom, being quite landlocked, and its approaches so protected that no sea of any consequence can rise. From Calshot castle to Southampton the deep water space embraces a channel 5 miles long and half a mile wide, between banks of soft mud which cover at high water. For 3½ miles of this distance the channel carries from 5 to 9 fathoms in it at low water, but at 1½ miles below Southampton, in mid-channel, between Hythe and Netley abbey lies the Netley shoal, with only 2 fathoms on it at low water, having a 4 fathom channel on its western side, and 3 fathoms channel on its eastern side; from thence to the Bar the depths are from 4 to 5 fathoms.

DIRECTIONS.—There are two channels for entering Southampton water, one on the eastern side of the Bramble with from 2¼ to 3¼ fathoms in it at low water, and the other on the western side with from 5 to 10 fathoms in it at the same time of tide.

In entering the western channel in a steam vessel, or with a fair wind, from midway between Stansore point and the S.W. buoy of the Bramble, steer for Calshot light vessel, keeping her on an E.N.E. bearing, and passing her about 2 cables' lengths to the westward; from thence the course up Southampton water is N. b. W. ½ W., leaving the Black buoys on the port hand, and the Red buoys on the starboard.

In entering the eastern channel, the course from the S.E. to the N.E. buoy of the Bramble is North, leaving the buoys about 2 cables' length on the port hand; from thence steer for the light vessel, and after passing about 2 cables' lengths to the westward of her, proceed as before.

One Red and one Bright light are placed on the royal pier at Southampton, and when in one, lead up to the pier. The channel up the river Teste, above Southampton, is marked by buoys and booms. A large proportion of the timber from the New Forest is exported from Redbridge, a village at the head of Southampton water, where there are several building yards, and a manufactory for linseed oil and cake.

SOUTHAMPTON, a large and well-built town at the confluence of the rivers Teste and Itchen, has, since the introduction of steam and railways, become the principal packet-station in the kingdom. Docks, upon a very large scale, are either in progress or completed, and the tidal basin, which comprises an extent of 16 acres, is 150 feet wide at entrance, and carries a depth of 30½ feet at high water springs, 26½ feet at high water neaps, and 18 feet at low spring tides. There is also a close dock and three dry docks; the former is 10 acres in area, 800 feet in length, 500 feet in breadth, 46 feet breadth of entrance, with 26 feet water in it, 24¾ feet over sill at high water springs, and 20¾ feet at high water neaps: the dry docks are respectively 400, 343, and 250 feet in length, and 80, 66, and 51 feet in breadth at entrance, with 25 feet over sills at high water springs, and 21 feet at high water neaps. The breadth of the anchorage off the town, is about 1¾ cables, which increases to 3½ cables lower down. The channel from the mouth of the Itchen to the entrance of the tidal basin is widened and deepened to 16 feet at low water springs.

There are 2 fixed lights on the dock pier heads, dark Red on the northern pier, and Red on the southern pier; when in one bearing N.N.E. ¾ E. they lead up the river Itchen, which is buoyed and beaconed on either side, to Southampton dock. The Itchen is not navigable above Southampton.

TIDES.—The *first* high water at full and change at Southampton is at $10^h\ 30^m$, the *second* high water at $12^h\ 45^m$, and low water at $4^h\ 0^m$; rise at springs 13 feet, at neaps 6¼ feet. The double high water is probably caused by the tide at Spithead, for as long as it runs strong to the westward, the water is kept up at Southampton, and there is no fall of consequence until the tide begins to slack at Spithead; but when the tide makes to the eastward at Spithead, the water falls rapidly at Southampton. After low water the tide rises pretty steadily for 7 hours, which may be considered as the proper high water; it then ebbs for an hour about 9 inches, at the end of which time it again commences to rise, and in about 1¼ hours reaches its former level, and sometimes higher; this is called the *second* high water, being something more than 2 hours after the first.

The ebb continues 3¼ hours, and falls fastest 2 hours after the *second* high water, at which time the stream runs strongest in the fairway. At neaps, although the tide stands for a considerable time near high water, there is no observable difference in the level.

SOLENT CHANNEL.—From Hurst to Egypt point there are no dangers in the channel, but the Solent banks; but long mud flats run off the northern shore, and several rocky ledges off the Island shore.

HURST ROAD affords but bad anchorage in easterly and S.E. winds, and indeed is but seldom used at any time, owing to the uncertain eddies, which render it almost impossible to keep a clear anchor. Small vessels sometimes anchor, and a few of them can lie very snugly out of the tide in a good depth of water over a clean bottom, at a moderate distance from the beach, but not farther towards the mud than to have the middle Needles rock on the eastern side of Hurst castle or just over the point.*

YARMOUTH possesses a convenient little port for small vessels, with an excellent quay; and valuable shelter is afforded by means of a substantial breakwater.

Good shelter will be found in Yarmouth roads from all but easterly winds, especially those between E.S E. and N.E., when it becomes much exposed. Vessels of moderate draught may anchor at about a third of a mile from the shore in about 7 fathoms good holding ground, with Sconce mast and Black Rock beacon in one bearing W. b. N, and the Church and Castle masts in line S. ¼ W., where there is little tide; but large ships should take up an outer berth in about

* A submarine cable was fixed in May 1855, about 400 yards to the westward of the west wing of the new battery at Sconce point, and extends in a direct line across the Solent (tending a little to the eastward) from that point to the central towers of Hurst castle, and vessels are cautioned not to anchor on that line of direction, lest, by doing so, they damage the electric cable, or lose their anchors.

8 or 9 fathoms, where the tide runs E.S.E. and W.N.W. with a velocity at springs from 2½ to 3 knots.

BLACK ROCK.—In running for the roads from the westward, care must be taken to avoid the dangerous patch of foul ground called the Black rock, the greater part of which dries at spring tides. It lies about a quarter of a mile to the westward of the anchorage, and a substantial Beacon points out its position; but as the foul ground extends some distance outside of it, it should not be approached closer than to have the conspicuous high tower of a house called the Refuge open to the northward of the old castle S.E. ¼ S.

A short distance outside the Black rock there is a deep hole, which must be carefully avoided by boats when blowing hard during a weather tide, as it occasions a great overfall of the tide, and sometimes the sea is truly alarming. It is known to the local fishermen as the Fiddler's race.

LYMINGTON ROAD.—Small vessels will find this a better roadstead than that off Yarmouth, with less tide. The marks for the anchorage in 5 fathoms over sand and mud, are, Jack-in-the-Basket in line with Lymington church, bearing N.N.W., and Hill trees on with Norton House S.W. ½ W.

LYMINGTON RIVER.—The western side of the entrance to this river is marked by a Red buoy on the spit which runs off from the western point of the entrance, and by Jack-in the-Basket (a large ball beacon). A buoy is much wanted to mark the eastern spit. In entering the river at high water, keep Jack-in-the-Basket in one with Lymington church, bearing N.N.W. until near the Red buoy. The buoy may be passed pretty close, and also the booms, leaving them all on the port hand. At the town there are 17 feet at high water springs, and 14 feet at neaps. The trade is confined to the coasting trade. In 1854, 254 vessels arrived and 214 sailed. Population in 1851 was 2,651.

SOLENT BANKS.—Three miles E. b. N. ½ N. from Yarmouth castle, are the Solent banks, an accumulation of very coarse gravel, with 22 feet on the shoalest head, and 7 and 8 fathoms round them. They lay off Hamsted point, directly in the fairway of the channel, and are an eighth of a mile long in an E. b. N. and W. b. S. direction, and 2 cables wide. The marks for the shoalest head are the western edge of Hill trees on with Yarmouth sand-house bearing W. b. S. ¼ S., and the Coast guard shed at Fish-house point, in line with large chalk pit on the distant downs, S. b. E. ¾ E.

HAMSTED LEDGE.—A rocky ledge runs off 2 cables' length in a N.W. direction from Hamsted point, which lies 3 miles to the eastward of Yarmouth. A White buoy is placed on the outer edge of the ledge, but as there is shoal water to the N.E. of the buoy, a large ship should give it a berth of a cable's length.

The SALTMEAD LEDGES extend nearly half a mile from the shore off Thorness wood, at nearly midway between Hamsted and Egypt points; they are not marked by a buoy.

GURNET LEDGES.—At 1½ miles to the westward of Egypt point is Gurnet Head, from which a series of rocky ledges run off; from thence a reef runs three quarters of a mile to the eastward, nearly parallel to the shore, at the eastern end of which a White buoy is moored at a little better than a mile W. ¼ S. from Egypt point. Egypt house open north of the old Lime Kiln, E. ¼ N., leads outside the buoy, but does not clear the rocks to the westward of it in Gurnet bay.

The LEPE MIDDLE is a shoal lying on the northern shore of the Solent off the entrance to Beaulieu river. It does not project farther than a mile from the shore, the same distance as the other mud flats between Hurst and Stansore point. but as the turning point into Southampton water, it is marked by a Black buoy placed in 3½ fathoms water. Eaglehurst tower, open east of Stansore point, N.E. ¼ E., and Hill head Coast-guard houses, in one with the west end of the clump of trees called the fir gardens on Portsdown hill, bearing E. ¾ N., lead over the eastern tail of the shoal in 4 fathoms.

BEAULIEU RIVER.—The entrance to this river, which lies to the westward of Stansore point, has a mud bar, over which there are but 2 feet at low water springs, but within it from 4 to 5 fathoms. Two Red beacons stand close to the westward of the Coast-guard buildings, and when in one, show the deepest water

over the bar; after which the channel is marked by booms. Spring tides rise 10 feet at Bucklers hard, 4 miles up the river, where in former years some frigates were built, but the practice of building ships there is now discontinued. There is no trade.

DIRECTIONS.—There are no dangers in the fairway, between Hurst and Egyptian points, but the Solent banks.

To avoid the long mud flats which run off from the northern shore, do not bring the high lighthouse at Hurst to the southward of a W. ¼ S. bearing until abreast of Egypt point, nor come into less than 6 or 7 fathoms water.

Hill trees on with the east end of the north side of Yarmouth, and well open to the northward of the Mount trees at the east end of Yarmouth, bearing W. ¾ S., leads in the fairway from off Hamsted point to Egypt point.

A safe rule for vessels turning to windward along the southern shore of the Solent from Hamsted point to Egypt point, is to keep a good half mile from the shore and not go into less than 8 or 7 fathoms water.

TIDES.—It is high water at Yarmouth, full and change at 10^h; springs rise 7 feet, neaps 6 feet. At West Cowes at $10^h\ 45^m$; springs rise 12½ feet; neaps 6½ feet. At Calshot castle at $11^h\ 30^m$. and low water at $4^h\ 0^m$; springs rise 13 feet, neaps 6 feet.

At the Solent banks, the stream turns to the westward at $9^h\ 30^m$, and to the eastward at $4^h\ 2^m$. Near Calshot light-vessel, the direction of the stream is nearly rotary, and turns at the same time as in Southampton water. At the east end of the Bramble near Hill head, it changes at the same time as at Spithead. To the westward of the Bramble in the fairway, the flood makes about one hour, and the ebb 2 hours later than at Spithead, and runs 6 hours each way.

The NEEDLES.—Throughout Christchurch bay the land is generally low, and still more so in the vicinity of Hurst castle, the base of which is very little elevated above the level of the sea. From thence the western end of the Isle of Wight, the Needles cliff, rises perpendicularly, and being composed wholly of chalk, becomes very remarkable when contrasted by the dark-coloured ground behind it.

The Needles lighthouse stands on the highest part of the cliff, and is coloured White; the lantern is 464 feet above high water, and shows a strong Red light to seaward, but bright towards St. Albans' head and Hurst point. Coming from the eastward, the Red light is first seen bearing N.W. b. N., and maintains that colour until it bears E. b. S. when the White light will open out; and when it bears about S.E. b. E. ¾ E., the Bridge reef is crossed.

HURST LIGHTS.—Two lighthouses (painted red) stand on Hurst beach on a N.E. b. E. ⅓ E. and S.W. b. W. ½ W. bearing, 755 feet asunder, the centre of the easternmost lantern being 66 feet and the other 29 feet above high water; both lights are Fixed and Bright. There is also a second Fixed light in the lower lighthouse, which shows up the Solent, and can be seen only between the bearings of west and W.N.W. ½ W.

NEEDLES CHANNEL.—The passage by the Needles has been generally considered extremely hazardous for large ships, but the following observations will prove to the prudent and intelligent seaman, that it would be bordering on folly to reject so useful and safe a channel, even for large ships, under ordinary favourable circumstances.

It is obvious that nothing could be gained by working through the Needles to Spithead against a strong wind, instead of to the southward of the island with the advantage of abundant sea room; but under any circumstances, it could scarcely be possible in a steam ship of any size to prefer the eastern passage, after being assured of the perfect safety and simple navigation by the Needles.

SHINGLES.—These shoals commence at about half a mile from Hurst beach, from whence they extend nearly W.S.W. 3½ miles, and terminate in two prongs, the eastern one of which is very dangerous, having only 5 to 6 feet over it at low water. Their northern side, except near the western or outer end, is of gradual slope, and the approach to it may be tolerably well ascertained, by a careful attention to the lead; but their southern or channel side is very steep, dropping

at once from almost a dry bank to a depth of several fathoms. Great caution is therefore requisite in approaching them on either side, for the numerous shallow heads, the rapidity of the tides, and the great violence with which the sea curls and breaks even with the least swell, would entail certain destruction on any vessel which might have the misfortune to be driven on them.

An opinion prevails that the Shingles undergo great changes, particularly in long southerly gales. It is quite certain that the crown of the bank, or the part subject to the wash and surface scour of the tide, is continually changing according to the state of the weather; for after a long continuance of easterly winds and smooth water high banks are heaped up, which are never wholly covered with the tide, and which usually disappear after strong southerly winds, when the surface frequently becomes so completely levelled as to leave no part visible even at low water. There is no proof, however, that the main body of the shoal is subject to any alteration of consequence either in figure or extent.

Milford church seen between the two western houses of Milford N.E. ¼ E. clears the western side of the Shingles and leads to the eastward of the Dolphin bank, the shoalest part of which in 3 fathoms lies N.W. ¼ N. 8½ cables' lengths from the S.W. buoy; the high lighthouse at Hurst in one with the beacon of brick-work on the point bearing E.N.E., leads to the S.W. buoy; and the two lighthouses in N.E. by E. ½ E. clears the southern side as far to the eastward as the Elbow buoy, but leading very close to it. From thence the high lighthouse must be opened to the southward of the other, in order to clear the eastern edge of the bank. On the flood the overfalls may be distinctly seen on their southern edge, and on the ebb the ripple on their northern edge.

SHINGLES BUOYS.—There are three buoys laid down for the purpose of marking the Shingles bank, viz.: the S.W. Beacon buoy (Red) is placed nearly a quarter of a mile to the westward of the south-west tail in 6¾ fathoms water, over gravel bottom.* The Red beacon on Hurst point in one with the High lighthouse, E.N.E., and the middle Needle rock in line with the Needles lighthouse S.E. by E. ¼ E., point accurately to it; the latter crosses the Dolphin bank in 4 fathoms.

The Elbow buoy, striped Black and White, lies in 6 fathoms close to the shoal, with the High lighthouse at Hurst bearing E.N.E., and Nodes Beacon a little open to the eastward of the tumulus on Headon hill S.E. ¼ S.

The N.E. buoy, chequered Red and White, is placed near the eastern extremity of the shoal in 5 fathoms, and marks the southern side of the entrance to the north channel. The marks for it are, the High lighthouse at Hurst a little open to the eastward of the Low lighthouse N.E. by E. ½ E. and a cottage to the eastward of Monks farm on with the south tangent of Hill trees S.E. by E. ¼ E.

It may be here observed, that the position of the south-west buoy is so far to the westward, that a vessel cannot steer from it to the Elbow buoy without passing over the tail of the shoals in 9 feet water.

BRIDGE REEF.—A dangerous ledge of rocks extends W.N.W. ½ W. a good three quarters of a mile from the Needles rocks, leaving between it and the S.W. tail of the Shingles a 5 fathom channel nearly a third of a mile wide, gravel bottom, and perfectly safe for ships of the largest draught. The three needles rocks in one, lead along the back bone of this reef, which is very narrow towards the western end, and steep-to on both sides. On the ebb the great overfall of the tide distinctly shows itself in quiet moderate weather by the ripple, and by a well defined line of broken water in strong southerly winds. With much ground-swell, which always accompanies southerly winds, and even rises with an impending breeze from that quarter, the sea breaks with great violence for a considerable distance from the point. The heads of this reef are so numerous and irregular,

* Peacock's refuge Beacon buoys, which are constructed of iron, are rendered very conspicuous by their large size, upright position, and conical frame-work. The upper part of this frame-work is terminated by a triangular glass reflector, which in the beacon on the Shingles is 20 feet above the water. There is a refuge deck or platform round these buoys, with a seat and rail about 2 feet above the water.

that large ships should not cross it nearer to the rocks than to have the south end of Hill trees over the pilot's house on Warden point. The north end of the trees over the same house will lead over or near a 19 feet rock, which lies very little if at all within the mark formerly recommended for entering the south channel, viz., Hurst lighthouses in one N.E. by E. ½ E ; to the eastward of this line the reef becomes more dangerous as the Needles point is approached. Hill trees open north of Hatherwood point bearing E. by N., clears all the shoal heads under 2 fathoms ; but a vessel drawing about 15 feet water, should keep the south part of the trees open of the low water rocks at Hatherwood point. Pepper rock open of Sun Corner E. by S. leads to the southward of the reef, and the Needles lighthouse on the outer Needles rock to the northward.

SCRATCHELL BAY lies between Sun Corner and the Needles point; and outlying from the former are two rocks, which are dangerous for small vessels making too free with the shore. St. Anthony rock, which dries at low water springs, lies a cable's length W. by N. ½ N. from the Corner, and a rock awash lies a full cable's length outside of it, on the same bearing. Pepper rock open of Sun Corner bearing E. by S. clears them to the southward.

GOOSE.—Two dangerous heads, which appear to be the continuation of a ledge running out of Alum bay, parallel with and close to the shore, lie N.W. by N. about half a cable's length from the outer Needle rock. The inner one dries at spring tides, and is called the Goose; and the outer, which lies a little to the northward, carries a depth of only 6 feet.

CAUTION.—Small vessels are cautioned against hugging the outer Needle rock too close, to avoid the ebb tide by getting into Alum bay, but should give it a berth of 150 yards at least, for, independently of the sunken rock above alluded to, there are many others equally dangerous for some distance outside the point.

FIVE ROCKS.—A small patch called the Five rocks, lies S.W. from Hatherwood point, at 1½ cables' length from the shore, having only 3 feet over them at low water, but they are only dangerous to small vessels which anchor in Alum bay, or turn to windward close to the shore to avoid the tide. The pilot's house on Warden point open of Hatherwood point, clears them to the westward; and the same house on with the south end of Hill trees, leads outside the rocky ledges off Hatherwood point, which extend a full cable's length from the shore.

Between Hatherwood point and Cliff's end, the bottom is nearly all foul, and various names have been adopted to identify the most dangerous of the numerous shoal patches of rocks which extend to a considerable distance from the shore.

TINKER PATCHES.—This large and dangerous field of rocks lies on the N.E. side of the anchorage in Totland bay, to which it affords a most valuable shelter. It has a depth on it of only 9 feet at low water springs near the western limit of the shoal at about half a mile from the shore.

The WARDEN LEDGE—is a dangerous reef of rocks which dries for above half its length at spring tides, and extends N.N.W. 4 cables' lengths from Warden point, at which distance there are only 9 feet at low water, the lead falling suddenly into deep water. A Black buoy is laid down close to its outer edge in from 5 to 6 fathoms water, leaving no passage inside of it. The marks for the buoy are, Sconce flag-staff over the low part of Cliff's end E.N.E. ¾ E., and Lymington church touching the point of Hurst beach N.N.E. ¾ E.

The Needles lighthouse well open of the shoulder of Headon hill bearing S.W. ¼ W., or Sconce point open of Round Tower point E. by N., clears the Tinker patches and Warden ledge.

HOW LEDGE, REEF, AND BANK.—At a quarter of a mile to the eastward of Warden ledge and running parallel to it from the shore, a rocky reef named the How juts out into Coldwell Bay ; and, indeed, shoal rocky ground extends all the way between the outer end of the Warden and the off-lying rocks at Cliff's end, and therefore even vessels of light draught must not approach nearer the shore than to have the whole of the fort on Sconce point open of Round Tower point. A wide berth must also be given to Cliff's end point, as detached heads

lie a long cable's length outside it. From hence to Sconce point, the shore may be boldly approached, as there are no off-lying dangers.

MINEWAY.—A shoal patch of foul ground lies at the western entrance of the North Channel a third of a mile from the beach, called the Mineway, carrying a depth of only 11 feet. The Low lighthouse at Hurst near the south end of the trees at West Hill, leads to the southward; and Milford church seen between the two western houses of Milford N.E. ¼ E., to the westward.

The NORTH HEAD is a dangerous gravel knoll, with a depth of only 9 feet over it at low water, lying on the southern side of the North channel, and narrowing the passage between it and the beach to a third of a mile. A vessel will be abreast of it when Milford church bears N. ¼ E.. and to the northward of it when the flagstaff at Sconce point opens to the northward of the Low lighthouse E.S.E. The extremes of Hurst and Sconce points touching lead over it.

The TRAP is a small spit of sand and gravel, thrown up at Hurst point by the strong eddy tide on the ebb; and although near the beach, and steep-to, it lies much in the way of vessels hugging the point to avoid the tide, and should therefore be given a fair berth.

ANCHORAGE.—The anchorage in Alum bay is only resorted to by yachts or small vessels, as there is much foul ground in it, and to avoid the tide they anchor close to the shore. The best anchorage is in from 3 to 3½ fathoms, with the junction of the cliffs bearing about S.E., and Hatherwood low point and Cliff's end in line N.E. b. E. ½ E.

Totland Bay affords excellent shelter for vessels of moderate draught, particularly in easterly winds, being well protected by the Tinker and Warden ledge. The best anchorage is on the southern side of the bay in from 3½ to 4 fathoms over a sandy bottom, with the Needles point and Hatherwood point in one W.S.W., and Nodes beacon over the west end of a small plantation at the bottom of the bay, S. ¼ E. Little or no ebb tide will be felt, and the flood is not strong enough to impair the security of the road.

DIRECTIONS for SOUTH CHANNEL.—A vessel running for the Needles channel from about a league off Portland should steer about E. ¼ S. for 15 miles, and, after passing St. Albans' Head, east 19 miles, up to the leading mark for the entrance. A stranger should carefully reach this line before he opens Nodes beacon to the northward of the Needles lighthouse. With any wind between S.E. b. S. round by the West to North, the South channel, under most circumstances, may be taken with perfect confidence. In large ships, however, it were perhaps better not to attempt it with the wind to the eastward of south, to insure the deepest water, for the course past the S.W. buoy, until within Bridge reef, is no better than E. ½ N.; and on entering the channel the wind generally draws more to the eastward. With scant south-easterly winds it should never be attempted with an ebb tide; and as a general rule, it cannot be recommended to turn through, except in a handy vessel of light draught, under the management of a skilful pilot, when it is not a hazardous evolution on the flood.

In coming from the westward with a fair wind, a vessel should steer so as to keep the Needles lighthouse on the outer Needles rock, to avoid the Dolphin bank, until Hurst lighthouses bear E.N.E., when the course must be altered to the eastward, to get the fair-way mark on, viz., the south end of Hill trees just south of Warden point bearing E. ¼ N.,* which will lead midway between the Shingles and Bridge reef, in not less than 5 fathoms. Keep this mark on until Hurst lighthouses are in one bearing N.E. b. E. ½ E.; when with a flood tide edge more to the northward, to avoid being set too close to the island shore. As the Elbow buoy is approached, keep the High lighthouse open its own breadth to the southward of the low one, bearing in mind that the Needles lighthouse must be kept open of Hatherwood point until the whole of the fort on Sconce point opens

* Captain Sheringham states, "I have little scruple in offering an opinion that a vessel drawing 19 or even 18 feet water, would be in jeopardy in crossing the Bridge reef, if she used the Hurst lighthouses by day or Hurst lights by night, in one, bearing N.E. by E. ¼ E. for her guide at low water springs."

of Round Tower point, to clear the Tinker, Warden, and How ledges; and when to the eastward of the Warden, by borrowing a little towards the island shore the eddies off Hurst will be avoided. After passing Cliff's end the seaman must act according to circumstances, recollecting that from Cliff's end the flood sets strongly for more than half the distance to Sconce point, when it strikes across for the Lymington shore towards Jack-in-the-Basket; and that from Hurst road the ebb runs for Nodes beacon, until the north channel opens out, when it turns rather suddenly to the westward through that passage. There is a strong eddy on the flood close in-shore on the island side.

A vessel should on no account attempt to turn through the south channel, except under able management, but the experienced pilot must bear in mind that on the flood the Shingles is the safe side, and that in standing to the northward, Sun Corner must be kept open of the Outer Needle rock, (for these points touching is a scraping mark for the S.W. tail of the Shingles), and not to cross the Bridge reef farther to the eastward than to have the south end of Hill trees open of the rocks off Hatherwood point. In working out on the ebb, when standing to the westward in the vicinity of the Elbow buoy, the High lighthouse should not be brought within its own apparent breadth of the Low lighthouse, as the ebb sets strongly over the Shingles. Perhaps it would be advisable, after getting abreast of Hurst beach, to throw the vessel's head towards the island, and drop her out with the tide.

At NIGHT the South channel is not unsafe with clear weather, a fair wind, and moderate attention. In entering from the westward, with the wind to the southward of west, keep the Needles Red light open or bearing about E. ½ S. until the High light at Hurst bears E.N.E., when the S.W. buoy of the Shingles will be nearly on the same line, and the High light will be seen a little to the northward of the Low light, when, if in a vessel of heavy draught, keep the lights on that bearing until the White light of the Needles is observed to grow dim or about to be obscured bearing about S.E. b. E. when she should be *quickly* edged to the eastward until the lights are in one N.E. b. E. ½ E.; then steer about E.N.E. to bring the high light a little open to the southward of the Low light, which has already been observed, is essentially necessary in passing the Elbow buoy. Run up with the lights in this position, taking care to avoid the eddy tide on the flood off Hurst point, and the indraft of the North channel on the ebb.

Entering from the westward, with the wind to the northward of west, it will be quite safe to open the Needles White Light on an E.S.E. ½ E. bearing; it will however not be prudent to bring it to the southward of that bearing, but as long as it is seen, and the depth not less than 10 or 10½ fathoms at low water, the vessel will be well outside the Dolphin bank. Soon after the Hurst lights are brought to the northward of E.N.E. ½ E. the depth will decrease from 9 to 7 fathoms, which will be an infallible warning of a near approach to the entrance. When in the fair-way, the depth may decrease to less than 5 fathoms, but as it again deepens to 10 fathoms, she will be well within the tail of the Shingles and Bridge reef.

In running for the channel from the southward, a vessel should bring the Hurst High light to bear E.N.E., and steer for it under easy sail, when the first cast under 10 fathoms will be a warning that she is about a mile from the S.W. buoy, and the Needles light will soon change its colour. The depths will now gradually decrease to 6 or 5 fathoms, and she will in all probability be about abreast of the buoy, or between the Shingles and Bridge reef, when the foregoing directions must be carefully attended to.

Although the lead should on no account be neglected, it will be found of very little use in running up the channel, for the flood hustles a vessel so quickly through it that the seaman has scarcely time to avail himself of any warning it might afford; but in approaching the entrance from sea, a marked attention to the soundings is of the utmost importance.

As a general rule, from whatever quarter the Needles channel is approached, with the Hurst lights in sight (and it should never be attempted by a stranger

unless they are so), the seaman may be assured that he is nearing the entrance when the depths are under 10 or 11 fathoms, according to the state of the tide, and that even that depth will bring him very close to the rocks, with the lights to the northward of N.E. b. E.; he must therefore use great caution in approaching the Bridge reef until the lights are to the eastward of that bearing, bearing in mind that the anchor must be ready for letting go at a moment's warning.

NORTH CHANNEL.—There are many occasions when the passage by the channel will be found of great advantage, particularly to steam-vessels of moderate size. It is also quite safe for any vesssel of about 15 feet draught, provided the wind is free enough to allow her to shape a course by the marks; but as the channel is narrow and the tides strong, vessels only of very small draught should attempt to turn through, and even then some practical knowledge is essential, bearing in mind that the rise and fall is only from 5 to 7 feet, and that the tide stands at the high level for two or three hours.

With North or N.E. winds a vessel with the ebb might work up with great advantage at the back of the Shingles, observing, in standing to the eastward, not to bring Milford church to the northward of N.E. ¼ E. until Hurst point is seen coming on with Sconce point, when it will be quite safe to keep to the eastward, gradually bringing the Low lighthouse over the south end of West Hill trees S.E. b. E. ¾ E., which leads through the north channel in not less than 17 feet at low water. With this mark on, she may run pretty close to the beach, which is steep-to, altering the course as necessary to keep about half way between the N.E. buoy of the Shingles and Hurst point; with the flood she will be quickly carried past the point, but care should be taken to keep outside the eddy off the Trap, which has been already mentioned.

Except in a steam-vessel, or with a strong leading wind, it would be useless to attempt the North Channel against the ebb; if, however, it is deemed practicable, take care that, in keeping close to the beach to cheat the tide, the vessel is not run upon the Trap.

TIDES.—It is an erroneous idea to suppose that the direction of the tides increases the difficulty of navigation in these channels, when in point of fact in many instances it very materially assists it. But the seaman may be assured that to inspire a proper confidence in his pilotage he should on no account neglect this important branch of his subject, and therefore his attention is invited to the following remarks:—

It is high water at the Needles, at full and change, at $9^h\ 46^m$; at Hurst it is high water at $10^h\ 0^m$, and again at $12^h\ 0^m$; and low water at $3^h\ 37^m$; springs rise 7 feet 6 inches, and neaps 5 feet. The western stream makes at $10^h\ 0^m$, and the flood or eastern stream at $3^h\ 40^m$, and the velocity of both streams over the Bridge and in the South channel is from 3 to 4 knots; but between Hurst point and the Island, 5½ knots, and to the southward of the bridge, about 2 knots.

A quarter of a mile outside the Needles rock and off Sun Corner the direction of the flood stream is S.E. ½ E. about 1½ knots; and it is worthy of remark that there is no indraft on the flood into the South channel unless within about 1½ cables' lengths of the rocks. The ebb sets pretty smartly across the Bridge about W.S.W., but gradually trends to the westward at about half a mile from the Bridge reef, where its direction, which is the fair tide, is W.N.W. ½ W., running 1½ knots at springs. The stream turns very nearly with the tide on shore at Hurst.

At the entrance of the South channel, or between the S.W. beacon buoy and the west end of Bridge reef, the flood sets directly through the fair-way S.E. b. E. ¼ E. towards the Needles rocks, but turns rather abruptly to the eastward about half-way between the tail of the Shingles and the outer rock, with a velocity at springs of at least 3 knots. It then continues to run smartly along the island shore, sweeping the bays, and over the shoals between Hatherwood and Sconce points, with a velocity of about 4 knots at springs, and nearly 3 knots at neaps. In mid channel the flood leads fairly up between the points with about the same strength.

Near the edge of the Shingles, on the northern side of the South channel, very fortunately the flood sets right off the bank for some distance before it bends to the north-eastward, totally disarming that formidable shoal of its terrors. On this side of the channel its velocity is considerably less, until it begins to feel the influence of the north channel tide, when it soon acquires the great rapidity of about 5½ knots at springs and 3 knots at neaps.

It may be gathered from the above that all danger upon the flood lies on the island side, and that it would be a matter of some difficulty in light winds to ground upon the Shingles with a flowing tide.

The ebb splits about a third of the way between Hurst point and Cliff's end, one point running through the north channel and the other setting obliquely across the south channel and over the Shingles, between the N.E. and Elbow buoys with considerable velocity. In any position in the south channel to the northward of the Warden buoy the indraft of the north channel is powerfully felt, and therefore great prudence is necessary not to get within its influence in light and baffling winds; for, if over on the Hurst side, a vessel would in all probability be swept through that channel, and if on the island side, she would inevitably be carried on the Shingles, unless very quick in anchoring. The seaman's safeguard, therefore, in light winds with an ebb tide is to keep well over on the island shore until abreast of the Warden buoy, from whence the tide will set clear of the Shingles. Great attention has been given to this subject, and therefore the following remarks may be of some value:—

Anywhere between Warden ledge and Sconce point a vessel will be more or less affected by the influence of the north channel tide, and therefore might be carried either through that passage, or so far to the northward as to be in danger of the Shingles. Between the Warden buoy and Hatherwood point, in mid-channel, the tide takes truly the course of the deep water. Abreast of Hatherwood Point, the influence of the outset at the entrance begins to be felt, and in calm weather would drive the vessel safely through the channel between the tail of the Shingles and the Bridge reef with a velocity of nearly 4 knots at springs.

There is no appreciable tide on the ebb in the different little bays on the island side, as it is deflected by the shoals; but beyond Alum bay small vessels should not approach the Needles rocks or the north side of the reef very closely, as the tide runs over it with considerable strength.

The flood tide sets fairly through the North channel, taking the course of the deep water, and runs with great rapidity from the elbow in Hurst beach, called Put-off point, to its confluence with the south channel flood, which takes place about 2 cables' lengths to the southward of the point, and very distinctly shows itself by a turbulent broken sea. There is a strong eddy running down between the meeting of the tides and the point, which must be carefully avoided, for a vessel in it would become totally unmanageable. At the western entrance its rate is from 3 to 3½ knots at springs and 2 at neaps, but from Put-off point to the eastward it increases to a race, running at springs at least 5 knots.

It has already been observed that the ebb splits about a third of the way between Hurst and Cliff's end. That portion which runs through the north channel sweeps gradually but with considerable force round Hurst point, causing a very strong counter tide in-shore. Like the flood it follows very accurately the direction of the channel, and sweeps round Christchurch bay, gradually diminishing in strength as the narrows are past. Its rate off Hurst point is about 4 knots at springs and 3 knots at neaps, and to the westward of Put-off point from 1½ to 2½ knots. The stream turns to the westward a little before high water by the shore, and runs about six hours each way.

At the back of the Shingles both flood and ebb are very regular, and have no great strength anywhere between its S.W. end and the north channel. The direction of the flood stream is from E. b. S. at the first quarter, to S.E. ½ E., which is its course at half tide, setting across the Shingles. At a mile from the edge of the bank, its greatest velocity at springs is about 2½ knots, but it runs with much greater rapidity over the shoal. The direction of the ebb is from

N.W. by W. to W. by N., from about 1 to 1½ knots. The turn of the stream is uncertain, but it has been found to run to the eastward from about one hour before the time of low water by the shore.

CHRISTCHURCH HEAD, 120 feet high, lies 6 miles to the eastward of Poole head; and, being composed of dark reddish-looking ironstone, and harder material than the coast to the westward, gives way more slowly to the action of the numerous springs and the violence of the waves; but even here it has been shown, by actual survey, that 300 feet have gone from the point of the Head between 1847 and 1854; the rocky ledge running off it being probably the remains of the former head.

CHRISTCHURCH LEDGE, a narrow rocky ledge, runs 2¾ miles in a S.S.E. ¾ E. direction from Christchurch head. A Black buoy is moored on it in 3 fathoms water at 1½ miles from the head, but there are only 2¾ fathoms at twice that distance from the shore. The tower of the Priory church at Christchurch just open to the eastward of the knoll on which the coast guard watch-house stands on the head, N. by W. ¼ W., leads to the westward of the ledge at half a mile from the shore; and Node beacon, on the Isle of Wight, in line with the junction of the red and white cliffs in Alum bay, bearing E. by S. ¾ S., leads to the southward of the ledge and the Dolphin up to the fairway mark for the Needles channel.

CHRISTCHURCH HABBOUR:—A haven half a mile wide, the entrance to which is nearly choked up by drift sand and alluvial deposits, lies N.W. b. N. 6¾ miles from the Needles. The narrow opening leading to it has twice changed its position in recent years. It was doubtless formerly a much better harbour than at present, as documents exist showing it to have been recommended in preference to Portsmouth for the formation of a dockyard. Vessels now of 60 tons burden are obliged to be lightened outside the bar before they can cross it. The town, which is 1½ miles from the haven points, stands a little above the junction of the rivers Avon and Stour, and contained in 1851 a population of 7,475. The tall tower of the Priory church, 131 feet above high water, is very conspicuous from seaward. There is but a small amount of coasting trade carried on in small vessels.

DIRECTIONS.—As none but small vessels can require to round the eastern end of Christchurch ledge in order to reach Christchurch bay, they may either closely round the buoy in 2½ fathoms or attend to the following marks:—A clump of trees on a distant hill open to the westward of High cliff trees N. by E. ½ E., or High cliff house bearing N.N.E. ¼ E., crosses the ledge in 2½ fathoms; and High cliff house bearing N. ½ E., crosses the tail of the Dolphin in 4½ fathoms, and leads to the eastward of the ledge in 6 fathoms, to the anchorage off Christchurch in about 3 fathoms water, over sand and mud, with the Priory church in one with Sandhills house, bearing N.W. by W.

TIDES.—At Christchurch it is high water at full and change at 9h 0m and again at 11h 30m; rise at the town 3 feet, at the Haven house 5 feet, and outside the bar 7 feet.

POOLE BAY.—At Poole head the coast again curves to the eastward, and from thence to Hurst point are a succession of low earthy cliffs intersected with deep ravines, called chines, worn away by the action of small streams running through them. From the soft yielding nature of the shore, the action of numerous springs, and the violence of the waves, the sea is encroaching on the whole of this part of the coast, evidenced by frequent landslips, and the fall of enclosures, fields, roads, and houses over the cliff.

In the southern part of Poole bay the ground is clear, and there is an open anchorage in 6 or 7 fathoms water, over sand and gravel, with Studland church bearing west 1½ miles. In the northern part of the bay, however, are several patches of dangerous rocks, with 6 and 7 fathoms between them. The shoalest head, named Inner Poole patch or Woodbury rock, lies half a mile off Flag head, and has only 8 feet over it; and another, the Outer Poole patch, lies nearly 1½ miles from the Bourne Mouth shore, with 16 feet on it. Arne trees (a remarkable clump on a hill 178 feet high, near the head of Poole harbour) on

with North haven point and well open to the southward of Brownsea island, N.W. b. W., leads to the southward of them; and the whole of Swanage well open of Ballard point, S.W. b. W. ½ W., clears them to the eastward.

BOURNE MOUTH is a pretty little watering-place, standing on the sides of a steep and thickly-wooded chine, at 2 miles to the eastward of Poole head. Between Bourne Mouth and Christchurch ledge there are no outlying dangers, and the shore may be approached to a third of a mile.

STANDFAST POINT.—In rounding Ballard and Standfast points, between Swanage and Poole bays, the shore should not be approached nearer than a quarter of a mile. Off Standfast point are two remarkable pinnacle chalk rocks, called Old Harry and Old Harry's wife.

STUDLAND BAY lies on the north side of Standfast point and affords good anchorage for small vessels during westerly winds; and if a south-easterly gale should drive them from their anchors, the banks within are soft mud. The best anchorage is off three remarkable projections in the chalk cliff, called the Yards, in about 2 fathoms water and near the following bearings:—the Agglestone (a large square rock on a small hill half a mile inland) open to the northward of the coast guard buildings on Red-end point, W. b. N. ¾ N., and Old Harry S.E. b. S.

POOLE is a port possessing a considerable amount of foreign and coasting trade. In 1854 the number of vessels belonging to the port was 109, registering 14,363 tons; the largest vessel was 632 tons. The chief articles of export are manufactured goods, corn, flour, biscuit, iron, salt, clay, stone, nets, cordage, leather, &c., and about 120,000 tons of Purbeck clay are annually exported to the potteries in the north of England. The imports are, corn, timber, hemp, flax, pitch, tar, oil, salt-fish, skins, wine, spirits, &c. The population in 1851 was 9,255.

Wareham is 5 miles above Poole, and stands between the rivers Trent and Frome, which unite at one mile below the town. The channel through the Frome, or south river, is navigable to Wareham quay for vessels of 20 or 30 tons. The population of Wareham in 1851 was 7,218.

HARBOUR.—From Studland to Poole head is a range of hillocks of drift sand, narrowing the entrance to the broad estuary of Poole harbour to 1½ cables' lengths between the Haven points. On the North Haven point are two Fixed Lights, bearing from each other N. ½ W. and S. ½ E. 700 feet apart. The high light is 37 feet, and the low light 16 feet above high water; the latter is masked between a N. b. E. ½ E. and N. ½ E. bearing.

DIRECTIONS.—The approach to Poole harbour, between the banks of tidal deposit, is narrow and intricate, and though great attention is constantly paid to buoying and lighting the channel, yet it is only a case of necessity that can justify a stranger in attempting to enter without a pilot, who is always in attendance in Studland bay.

The greatest depth on the bar at high water springs, at about 1½ cable's lengths to the southward of the bar buoy, is only 14½ feet, and at low water springs 8 feet; and after passing the bar buoy, which bears north a good three quarters of a mile from Standfast point, the course between the Black buoys on the starboard hand, and the Red buoys on the port, is N.N.E. ½ E. until Lytchet trees, a large clump of trees on the high back land over Poole, are in one with the north-end of the coast guard buildings, bearing N. b. W. ½ W. This mark will lead in the deepest water between the Haven points, after which keep in mid-channel until abreast of Brownsea castle, where vessels seeking shelter may anchor in 5 fathoms, landlocked.

As the outer sands are frequently shifting, no great dependence can be placed on the marks for the Swatchway, which, in 1849, had 2 feet less water than the proper channel. A Chequered Red and White buoy which bears N.N.E. 1½ miles from Standfast point marks the north point of the entrance to the Swatch, and the leading mark through at that time was, the west end of Lytchet trees in one with the east end of Brownsea trees, N. b. W., until Lytchet trees are on with the coast guard buildings, when proceed as before.

From Brownsea castle the channel is clearly pointed out by Red buoys, to be left on the port hand, and booms on the mud bank to be left on the starboard hand. The Middle ground has a Ball beacon on its southern end, which must be left to port, and a Red buoy on its upper end; after passing which the channel is marked by booms on each side to Poole creek, which has a Black buoy on the starboard side of the entrance and a beacon on the port side. The main channel above Poole to Wareham is marked by booms on each side with Red and Black buoys at the first curve; the Red to be left to port and the Black to starboard. Besides the main channel, Poole harbour contains a number of creeks, inlets, bays, and islands, for which see chart.

AT NIGHT.—If compelled to take the harbour at night, keep the high light just open to the eastward of the low light, bearing N. ½ W., which will lead through the Swatch and up the channel to the Haven points; after which keep in mid-channel, and anchor off Brownsea castle. If the vessel's draught makes it unadvisable to try the Swatch, stand into Studland bay until the low light (which is masked between a N. b. E. ¼ E. and N. ¼ E. bearing) begins to shut in, then, keeping it just visible, steer for it on a N. ½ E. bearing, which will lead up to the bar buoy. After passing the bar buoy, keep both lights in sight, and steer up N.N.E. ¼ E. between the buoys, until the high light opens to the eastward of the low light, when proceed as before.

TIDES.—At Brownsea island, on full and change days, the *first* high water is at 8h 50m, the *second* at 12h 25m, and low water at 3h 50m; rise at springs 6½ feet, at neaps 3 feet. At Poole quay the *first* high water is 20 minutes later than at Brownsea; the *second* and low water are simultaneous; rise, the same as at Brownsea. At Russel quay, half way between Poole and Wareham, the *first* high water is 40 minutes later, and the *second* and low water 20 minutes later, than at Brownsea; the rise the same. At Wareham quay, the *first* high water is 1h 25m, the *second* 1h 15m, and low water 1h 25m later than at Brownsea; rise at springs 4 feet, at neaps, nil. From the great extent of mudlands over which the tide flows, and the number of streams that fall into Poole harbour, the tide rushes with great force through the narrow opening at the Haven points, and has there scoured out a channel with 6 to 8 fathoms in it at low water.

PEVEREL POINT.—Between St. Albans' head and Durlston head is a clear bold shore of dark looking limestone cliffs, the quarries of which are extensively worked. At Durlston head the coast bends abruptly to the northward, forming the western shore of the deep inlet between St. Albans' head and St. Catherine point. Several rocks lie between Durlston head and Peverel point, and vessels passing should not bring the head to the southward of a S.W. by W. ½ W. bearing, or approach the point within a third of a mile, until Swanage church comes well open of the northern shore of Peverel point W.N.W. Old Harry, a pinnacle rock off Standfast point, on with Poole head watchhouse, which stands in the north-west angle of Poole bay, N. by E. ¾ E. leads three quarters of a mile outside of Peverel ledge. A race of tide runs off Peverel point.

SWANAGE BAY.—The shores of this bay rise with a gradual slope from the sea, and are highly cultivated. At the north point of the bay is the west end of the chalk range, that extends across the country from White Nore to Ballard down, where it terminates in white cliffs, which re-appear again at the Needles. The anchorage in Swanage bay is well sheltered from winds between S.W. ½ S. (round by west) and N.E., and is much used by vessels detained by south-westerly winds. They anchor on the south side of the bay in from 4 to 6 fathoms, over fine sand, at half or three quarters of a mile from the shore. The population of Swanage in 1851 was 2,139. It exports a large quantity of free-stone for paving and building.

TIDES.—At Swanage the *first* high water, at full and change, is at 8h 20m, the *second* at 12h 20m, and low water at 3h 20m; rise at springs 6 feet 3 inches, at neaps 2 feet 6 inches. We meet here the *second* high water tides, which, commencing in the Solent, are, on full and change days, at Southampton and at Hurst point 2 hours, at Christchurch 2½ hours, at Poole 3½ hours, and at Swanage 4 hours. after the *first* high water. The influence of the *second* tide

continues to be felt as far as Portland, but to the westward of St. Albans' head it comes so near the time of low water and causes so small a rise, that it is called the *second* low water; the intermediate rise of from 5 to 7 inches being termed the gulder. At Lulworth the *first* low water takes place 4½ hours after high water; the gulder then rises for 1½ hours, and the *second* low water occurs 2 hours after the gulder has ceased rising. At Portland breakwater the *first* low water is 5 hours after high water, and the *second* 3 hours later. At the Bill, from the constant swell, the level cannot be spoken of with certainty to inches, but low water continues about 2 hours.

SECTION VII.

FROM ST. ALBANS' HEAD TO PLYMOUTH.

VARIATION, 22½° TO 23½° WEST.

THE ground is foul about St. Alban's head, extending to the southward about three quarters of a mile, while to the westward a narrow portion of it extends nearly 2 miles. An overfall or race stretches to the westward, both with the ebb and the flood. To the northward of St. Albans' head is Chapman's pool, where small vessels with easterly winds may stop a tide.

ST. ALBANS HEAD, a bold headland 359 feet high, has generally a race running off it, particularly in blowing weather, which is caused by the unevenness of the ground. The overfalls are sometimes found more westerly, and sometimes more easterly, according as the wind and tide act in concert with or against each other. There is not less than 6 fathoms water in their vicinity, with 12 and 15 fathoms on both sides, as well as to the southward.

KIMERIDGE LEDGES.—From Worbarrow head to St. Albans' head are a succession of dark-looking cliffs, fringed by long flat ledges of indurated clay, some of which extend half a mile from the shore. Arishmill gap (known by its white sandy beach) open of Worbarrow head (known by a small conical hill on its summit) bearing N.W. ¾ N., leads outside of them. There are two coves between Kimeridge bay and Chapman's pool, but neither of them afford safe anchorage.

WORBARROW BAY lies a mile to the eastward of Lulworth cove, and shelters from winds between W. by N. (round by north) and S.E. by E. The best anchorage is between Arishmill gap and Worbarrow head, at a third of a mile from the shore, in from 5 to 7 fathoms water, over fine sand.

WATER.—There is a stream of fresh water and good facilities for boats watering in the small boat harbour at Osmington mills, which lies to the westward of Ringsted point; the west point of the entrance is marked by a beacon. Water may also be obtained at Lulworth, Arishmill gap, and Wor cove.

LULWORTH COVE, which lies 3 miles to the eastward of White Nore, is small and circular, and in cases of necessity would afford shelter to small vessels. The clear entrance to it is about 250 feet wide, between the ledges of low water rocks which run off from each point of the entrance; the longest ledge being on the western side. In entering keep one-third over from the eastern cliff. Within the cove are 12 feet at low water.

TIDES.—It is high water, full and change, in Lulworth cove at $6^h\ 35^m$ springs rise 7 ft. 0 in.; neaps 2 ft. 9 in.

WEYMOUTH, originally a small fishing-town, has, from its excellent beach and roadstead, become a place of some importance and of great resort for bathing and yachting. In 1851 its joint population with Melcombe Regis was 9,548, but it has only a coasting trade, requisite for supplying the town and neighbourhood. There is a patent slip for repairs, and two building-yards. A tank, for the use of shipping, is formed on the north quay, and vessels are supplied with water at a charge of 4 shillings per ton.

ROAD.—Weymouth road is well sheltered, and open only to winds between south and east. Vessels may anchor about a mile off the town in from 5 to 8 fathoms water, over sand and gravel. They should not anchor within three quarters of a mile of the northern shore of the road, as there is foul ground there.

HARBOUR:—The little river Wey divides the towns of Weymouth and Melcombe Regis, and falls into Weymouth road on the northern side of the Nothe point, from which a stone pier runs out in an E.N.E. direction for 280 feet, and is continued 370 feet farther by a breakwater of loose stones that covers at high water; its outer end is marked by a Red Ball Beacon. The entrance to the harbour is protected on the north side by a jetty (a double line of stakes filled with loose stones) which runs out in an E. b. S. direction for 800 feet from the south end of the esplanade, but it covers at high water. A Red Fixed Light is shown all night on the outer end of the pier, at an elevation of 23 feet above high water, and may be seen at the distance of 5 miles.

DIRECTIONS.—In approaching the harbour, keep St. John's church (at the north end of Melcombe Regis) open to the eastward of the beacon on Weymouth breakwater, bearing N. ¾ W., to clear a bed of rocks called the Mixen, which runs off nearly a cable's length to the eastward from the Nothe point; these, and the rocks which run off about 180 feet from the north-east point of the Nothe in the direction of St. John's church, and which are mere stones and ought to be removed, are the only dangers to avoid in entering the harbour, which carries a depth of 6 feet in it at low water and 13 feet at high springs. In entering, give the beacon, the south pier, and shore, a berth of about 200 feet until past the enclosure of the coast-guard buildings on the Nothe point and abreast of the outer south quay. Vessels are then within the northern jetty and past the rocks running out from the Nothe, after which the deepest water is on the southern side of the harbour. A swing bridge connects the towns of Weymouth and Melcombe Regis, above which is a large pool, called the Black Water, where yachts and other small vessels are laid up during the winter.

RINGSTED LEDGES.—There are several rocky ledges running off the shore on the northern side of Weymouth bay. Those off Ringsted point are low flat ledges of indurated clay, extending a third of a mile from the shore, with only 10 feet water over the outer end. Lodmoor farm just open of the base of the cliff at Preston coast guard houses N.W. ½ W., leads to the southward of all the foul ground from Redcliff point to White Nore. Between White Nore point and Worbarrow head, the shore is generally bold, but there are a few outlying rocks, the clearing mark for which is, the Swyrebarrow hill (674 feet), 2 miles north of St. Albans' head, on with Broad Bench point, bearing S.E. by E. ½ E.

PORTLAND BILL.—In the vicinity of Chesil beach the shore is low, the peninsula of Portland suddenly rising into a promontory to the height of 488 feet. which assumes the form of a wedge, and declines gradually to the southward: the point of the wedge being at the Bill, where the cliffs are only 10 feet in height. The peninsula is 3½ miles long, and at its greatest breadth 1½ miles broad, and is everywhere rugged, and its eastern side presents all the appearance of regular layers of masonry, even to its summit. The south point of the Bill is distinguished by a white Obelisk, 60 feet in height; and half a mile within the Bill are two lighthouses (white) 1,509 feet apart, in which are exhibited two Fixed lights, the High light 198, and the Low light 131 feet above high water; they may be seen in clear weather from 16 to 19 miles. When in one bearing N.N.W. ½ W., they lead between the Race and Shambles.

PORTLAND LEDGE.—The rocks project half a cable's length from the southern point of the Bill, where there are 3 fathoms water, and a rocky ledge runs off in a S.S.W. direction, on which there are 5 fathoms water at 2 cables' lengths, 10 fathoms at three quarters of a mile, and 20 fathoms at 1¼ miles from the Bill. On either side of the ledge the water is much deeper, with uneven ground, the depths varying from 12 to 20 fathoms on the eastern side, and from 12 to 40 on the western side.

The RACE OF PORTLAND is a periodical commotion of the sea which rages

with great violence on the southern side of the Bill, varying in distance from it as the winds are northerly and southerly, and in position according as it is ebb or flood. The Race is caused by the Portland ledge which projects more than a mile in a southerly direction from the Bill; and both sides being remarkably steep, the transition from deep to shoal water is very sudden. With northerly winds, the distance of the Race from the Bill is nearly 2 miles, and there are great overfalls even without that distance; but with southerly winds, it scarcely exceeds half a mile. During the north-eastern stream of tide, the raging takes place to the eastward of the rocky ledge, and during the south-western stream to the westward; thus varying in position between the two streams of tide about a mile independent of the effects of wind. During the spring tides, which rush past the Bill with a velocity of 5 or 6 knots, the agitation is so violent as to render it absolutely dangerous for small vessels to attempt going through it; and in tempestuous weather, during the north-eastern stream of tide, the whole space between Portland and the Shambles is one continued sheet of broken water. The breaking sea thus created has, in some instances, so alarmed strangers, as to induce them to bear up and run their vessels on shore on Chesil beach; a most fatal error, leading, in the majority of cases, to the loss of ship and crew. In fine weather, even, the noise caused by the Race may be heard a considerable distance.

The SHAMBLES is a dangerous shoal, the western end of which lies about $2\frac{1}{4}$ miles S.E. $\frac{1}{2}$ E. from the pitch of the Bill of Portland, and the eastern extreme E.S.E. $4\frac{1}{4}$ miles from the same point. It trends nearly E. b. S. and W. b. N., is 2 miles in length, and half a mile in breadth, and is composed principally of sand and broken shells, and may always be distinguished in fine weather by the rippling over it.

The shoal is irregular having several shoal heads with only from 11 to 18 feet on them, and 5 to 7 fathoms between them; the whole of its southern side being very steep, shoaling from 11 and 12 fathoms to 16 and 20 feet in less than a cable's length from the bank. During a gale the sea breaks furiously over it, and several instances are known of small vessels foundering on it. Portland church, 2 degrees open to the westward of Portland mills, bearing N. $\frac{1}{4}$ W., leads over the west end of the Shambles in 8 fathoms; the church in one with the mills leads over the west end in 26 feet, and the church on with the southern side of Church cove N.N.W. $\frac{1}{4}$ W. points to the shoalest part of 11 feet. Wyke Regis church open of the low north-eastern point of Portland N.N.W. $\frac{1}{4}$ W. leads about 6 cables' lengths to the eastward of the shoal, and the church in one with the point leads over the eastern end in 8 fathoms; Anvil point, just seen clear of St. Albans' head, E. $\frac{3}{4}$ S., leads half a mile to the northward, and Anvil point 3 degrees open of St. Albans' head (the head bearing to the northward of east) leads to the southward. The tide sets over this shoal in an E. b. N. and W. b. S. direction, with a velocity of from 3 to 4 knots, making to the eastward at full and change at $4^h\ 10^m$ and to the westward at $10^h\ 20^m$.

DIRECTIONS.—The best leading mark between the Race and the Shambles is, the small Chalk-pit (which lies to the westward of the White Horse on Osmington downs) over the eastern point of Portland bearing N.N.E. In rounding the Bill of Portland from the westward, it should be remembered that the eastern stream sets direct from the Bill for the Shambles; but immediately the point is rounded, if the vessel is kept in shore she will escape this tide, and find a tide setting fair along the land. Vessels bound to the westward with a westerly wind may, while the eastern stream is running, turn to windward nearly up to the point by keeping near the shore; if they attempt to round the Bill before the tide slacks they will be swept off through the Race, and must stretch inshore to work back again. Small vessels may approach the eastern side of Portland to a cable's length with not less than 3 fathoms; large vessels should not approach nearer than a quarter of a mile. There is a pretty good channel between the Race and the Bill, having from 3 to 9 fathoms water in it, which may be occasionally used by small vessels if necessary, particularly with

a free wind and slack water, ranging within one-third of a mile of the Bill, though occasionally the Race extends home to the land.

AT NIGHT the two Lights in one, bearing the N.N.W. ½ W., will lead between the Shambles and the Bill; but during the north-eastern stream of tide, it will be necessary that the highest or north-westernmost light should be kept open to the southward of the lowest or south easternmost light to counteract its effects, as it sets directly for and with great velocity over the Shambles, and the south-western stream sets as strongly into the Race. This channel should never be attempted without a commanding breeze.

PORTLAND ROAD is a secure roadstead, protected from all winds but those between south and east. To guard against these a breakwater is now in course of formation, running out 1,500 feet in an easterly direction from the north-east point of Portland; thence curving to the north-eastward, leaving an opening to the Harbour of Refuge of 500 feet at the curve. The eastern extremity is now (1855) 3,600 feet from the shore, and is rapidly advancing; at night a Red Light is shown from the extremity of the stage, at a height of 30 feet above the mean level of the sea, visible, from all points of the compass, at 8 miles in clear weather, and vessels should not approach the light in passing it to the eastward nearer than a cable's length, to ensure clearing the stage. The breakwater is to be extended 6,000 feet beyond the opening in a north-east direction, and when completed, the entrance to Portland Road, between its northern extremity and Nothe point, will be 1½ miles wide. The area included between the point and the breakwater, and without the 5 fathom line, will be 1,537 acres, in the whole of which vessels may anchor in from 5 to 9 fathoms over clay, sand, and gravel, sheltered from all winds. The usual supplies can be obtained at Portland and Weymouth. From 40,000 to 50,000 tons of stone are annually exported from Portland, independent of that used in the construction of the breakwater.

APPEARANCE OF THE COAST. — Chesil bank is, at its junction with the peninsula of Portland, 40 feet in height, and 650 feet across from West bay to Portland road. One and a half miles to the westward of Portland is the entrance to the Fleet creek, which is 9 miles long, and runs up to Abbotsbury, dividing Chesil bank from the main land, but it is only accessible to boats. From the Fleet the shore gradually rises to the Nothe, which is 75 feet high; from thence it runs low and flat to the north shore of Weymouth road. Jordan hill rises with an even slope to 160 feet at the north-west angle of the bay, and to the eastward of the hill commence a series of low cliffs intersected with steep ravines. Redcliff point is the westernmost point, and is 150 feet in height. The height of the cliffs gradually increases to White Nore (chalk over green sand), which is 542 feet above high water. The land rises from the cliffs to the downs, and on Osmington Down, at 1½ miles from Redcliff point, is a large figure of a man on horseback (intended for George the Third), showing white on the green slope of the hill, and visible for many miles to seaward. Between Weymouth road and St. Albans' head the shore is chiefly of chalky cliff, from the latter to Peverel point dark rock, and then again chalky as far as Old Harry, where it abruptly declines.

WEST BAY lies on the north-western side of the Bill of Portland, and affords good shelter against those winds which blow from between S.S.E. and N. b. E. The water is however deep, viz., 12 to 16 fathoms, and the general quality of the ground is coarse loose gravel, or shingle. The best anchorage is off the south end of Chesilton village, at a third of a mile from the shore, in 8 or 9 fathoms over clay bottom, with Portland High light touching Blacknor point, bearing S.S.W. ¼ W.

The greatest foresight is necessary, when using this anchorage in the winter season, to provide against sudden shifts of wind, as those which blow strong from the westward and south-westward send in a very heavy turbulent sea, against which few anchors would hold, or few vessels could attempt to beat with any prospect of success; for although the tide sweeps strongly along the cliffs to the southward, yet its influence is too closely confined to the shore to produce

any advantageous effect on vessels striving to get an offing. It is, however, possible, between the periods of half-flood and half-ebb, to work out of the anchorage with the wind at all to the southward of S.S.W., and from half-ebb to half-flood the attempt might succeed, provided the wind was in any degree to the northward of W.N.W.; but too much reliance must not be placed even on this alternative, a vessel on all occasions being much safer at sea.

DIRECTIONS.—Although it is possible that a succession of south-westerly gales may force the water into this bay, and destroy the usual set of the stream, yet it is certain that in fine weather, and during spring tides, no perceptible indraught exists. A vessel therefore embayed in a S.W. gale should endeavour to keep off-shore until the eastern stream makes off the Bill (at full and change the eastern stream makes at $3^h\ 45^m$, and the western at $10^h\ 15^m$), then with the assistance of the tide endeavour to round the Bill, and passing within the Shambles, make for Portland roads. If the western stream is running, and she cannot be kept off-shore, then strive for Bridport, which lies 16 miles to the N.N.W. of the Bill; and when the harbour cannot be entered, take the beach close to the eastern side of the piers.

TIDES.—At Chesilton it is high water, full and change, at $6^h\ 13^m$; springs rise 11 feet 4 inches, neaps 6 feet 10 inches. In the middle of West bay, at $1\frac{1}{4}$ miles from the shore, and $1\frac{3}{4}$ miles N. b. W. $\frac{3}{4}$ W. from the Bill, the stream makes to the south-eastward at $1^h\ 40^m$ and to the north-westward at $10^h\ 46^m$, thus setting towards the Bill nine hours out of twelve, with a velocity of 2 knots, which rate is rapidly increased as the Bill is approached.

BRIDPORT HARBOUR.—The small but secure harbour of Bridport, which lies 16 miles to the N.N.W. of Portland Bill, has 14 feet water between the pier heads at high springs, but it dries at low water. The piers are 50 feet apart, and form a straight canal-like entrance, in a N.E. $\frac{1}{4}$ N. direction for 700 feet, and then expand into a secure basin, 530 by 145 feet, capable of containing about 30 vessels of the tonnage that usually resort to the port. The clear space for entrance or egress is only 40 feet in breadth. About 445 feet within the pier heads, is a storm gate, which is closed during southerly gales, to shut out the heavy swell that would otherwise be thrown in. During these gales the sea breaks so heavily at the entrance, that the harbour is unapproachable by ship or boat. Small vessels would then find secure shelter in the pier harbour of Lyme Regis.

The waters of the Brid are confined by sluice-gates at the upper part of the harbour, until the time of low water, when they form a sufficient scour to keep the entrance free from any bar. There are two building yards; and the amount of tonnage belonging to the port in 1855, was 1,985 tons, the largest vessels being about 200 tons burthen. The chief articles of import are hemp, flax, wheat, potatoes, dried fish, and train oil; the exports are sail cloth (for the navy), fishing nets, and beer. There are but few houses and stores at the harbour, the town of Bridport lying $1\frac{1}{2}$ miles inland. In 1851 it contained 1,468 inhabited houses, and its population was 7,566. A buoy is moored W. b. S. $\frac{3}{4}$ W., $1\frac{1}{2}$ cables' lengths from the pier heads, to assist vessels in warping in or out of the harbour. The usual course pursued in entering is to shoot between the piers, and be tracked into the harbour by men always in attendance at tide time. The best anchorage outside the harbour is abreast of the piers, at about a quarter of a mile from the land, in 3 or 4 fathoms water, over a bottom of fine sand; further off the ground is foul.

TIDES.—It is high water at Bridport piers at full and change, at $6^h\ 5^m$; springs rise 12 feet 5 inches, neaps 8 feet 10 inches.

The HIGH GROUND and POLLOCK are rocky shoals about three quarters of a mile apart, having 6 fathoms water between them. The former lies W. b. N. $\frac{1}{2}$ N., $1\frac{1}{4}$ miles from Bridport pier heads, and about half a mile from the shore. It is half a mile in length and 800 feet broad, and has a depth of only 9 feet of water near its south-east end. The Pollock is a smaller shoal, about 800 feet in diameter and nearly circular, and lies W. b. S., nearly three quarters of a mile from the pier heads; its shoalest head has only 11 feet over it. Puncknols knowl, a small conical hill (587 feet high), having a small house on its summit,

in one with the low east end of the cliff to the eastward of Burton coast guard houses (it is the last cliff east of Bridport harbour), bearing S.E. b. E. ¼ E., leads to the southward of both shoals; Down Hall, a large white house, in trees, on the northern side of Bridport, on with Bridport pier heads, N.E. ¾ N., clears them to the eastward; the west end of North hill (376 feet high), the first hill inland of Bridport east cliff, on with the pier heads leads between them, and Thorncomb peak bearing N.E. leads to the westward.

LYME REGIS.—The small pier harbour of Lyme Regis dries at low water, but it carries a depth of from 9 to 12 feet at high springs. The Cobb or pier, a substantial stone structure, effectually shelters vessels within it from south-westerly gales, while the inner pier and north wall also protect from the swell caused by gales from the south-eastward. The bed of the harbour being formed of hard marl, with only a surface coating of a few inches of mud, vessels occasionally strike heavily on taking the ground, particularly when a heavy sea outside causes a run within the pier. From the outer Cobb end, in the same line as the Cobb, there is a projection of loose stones, on the outer end of which a Beacon is erected. At night, from half flood to half ebb, a Red light is shown on the inner pier head at 11 feet above high water, and a Green light at the Custom-house at 21 feet above the same level.

DIRECTIONS.—To enter the harbour at night keep the Green light a little open to the northward of the Red light, bearing N.W. ½ N., which will clear the outer Cobb, and lead to the inner pier heads. At low water in a southerly gale, the sea breaks heavily round the piers, and the proper place then for a wrecked crew to take the beach would be under the bathing house at the eastern end of the town. Lyme church on with Fairfield house, (a large white house in trees half a mile inland) bearing N. b. E. ¾ E., leads to it.

The trade of Lyme Regis was formerly much greater than at present; about 90 years since the customs duties amounted to £16,000 per annum; in 1854 the average of the preceding three years was only £155. The registered tonnage of the port is 1,971 tons, chiefly engaged in the coasting trade and the export of blue lias limestone, much used in submarine structures. The population in 1851 was 2,661.

TIDES.—It is high water at full and change at Lyme Regis at $6^h\ 16^m$, rise at springs 12 feet 4 inches, at neaps 9 feet 2 inches. At a mile to the southward the stream makes to the eastward at $5^h\ 30^m$, and to the westward at noon; its greatest velocity being half a knot, with a long interval of nearly slack water.

At BEER HEAD, and for a mile on either side of it, is a range of chalk cliffs, the westernmost in England, rising to a height of 426 feet. Between the Head and Haven cliff is the broad and fertile valley of the Axe, apparently the ancient bed of a large river, though at present only an insignificant stream, the Axe, trickles through it. At the entrance of the Axe, there is a small pier and landing quay. At springs there are 12 feet water over the bar.

On the eastern side of the Beer Head is a confined anchorage called Beer roads, which shelters from northerly winds. The marks for anchoring are, Beer Head W. ¾ S., and Beer village N. b. W. ¾ W., in about 5 fathoms over a sandy bottom.

TIDES.—At Seaton it is high water, full and change, at $6^h\ 5^m$; springs rise 13 feet 8 inches; neaps 9 feet 6 inches.

Between CULVERHOLE POINT and EXMOUTH are the three watering-places, Seaton, Sidmouth, and Budleigh Salterton. Neither of these towns have any trade, but colliers in fine weather anchor abreast of them, and land their cargoes on the beach. The population of Sidmouth in 1851 was 2,516.

Off Budleigh Salterton is a detached rock with only 2 feet water over it. It lies about half a mile to the S.E. b. S. of the chapel. Otterton ledge runs off a quarter of a mile from Otterton Head in a S.W. ¼ W. direction, but all the rocky ledges between Straight Point and Beer head may be avoided by keeping half a mile off shore. The rivers Otter and Sid are choked at their entrance by an accumulation of shingle beach.

EXMOUTH HARBOUR, lies at the bottom of the deep bight known under the general name of Lyme bay, the extreme points of which are the Bill of Portland, and the Start; it bears from the former N.W. b. W. 35½ miles, and from Berry head N.E. 13 miles. It is a bar-harbour of difficult access, totally unapproachable in a heavy sea, and therefore must on no account be depended upon as a safe refuge in stormy weather.

The entrance to the estuary of the Exe lies between a long sandy point of considerable extent stretching 1½ miles from Langstone point, called the Warren, which is covered with coarse grass and abounds with rabbits, and on the eastern or opposite side by Orcomb point, which is composed of red earth, and rises 60 or 70 feet above high water.

The CHANNEL is very narrow, with a long shallow bar of broken water, bounded on one side by a fringe of dangerous rocks uncovering only at near low water, and on the other side by far-spreading treacherous sands.

ORCOMB LEDGE.—Rocky ledges (red sandstone) extend nearly a quarter of a mile from Orcomb point; and as no buoy is laid down to mark their extent, they are dangerous to vessels entering the harbour. The shelf continues to the eastward as far as Straight point, and to the N.W. in the direction of the harbour channel for three quarters of a mile and dries from half tide to low water. Various names have been given to the salient prongs of this ledge, viz.:—Orcomb ledge, Flat ledge, Page ledge, Double ledge, Long ledge, and the Congar rocks; and five Black buoys mark their outward edges.

DAYS LEDGE.—A small patch of rocks called Days ledge, which dries at low water, lies at the point under Gun cliff near the coast-guard station and is much in the way of small vessels: but its position is sufficiently pointed out by a Black buoy which is laid down well outside of it. It may be well to notice that heaps of limestone are frequently very improperly left at low water mark, much in the way of boats and small craft creeping close in-shore to avoid the tide.

CHECKSTONE LEDGE.—A little above Days ledge, and on the western side of the channel, is a long ledge of flat rocks which only shows at spring tides, called the Checkstone, the position of which is marked by a White buoy placed at its northern extremity. A conspicuous Perch is also erected upon a small rock called the Checkstone, considerably within the ledge; but as it lies entirely out of the fair-way, the utility of the Perch in its present position is not very visible.

The POLE is an immense deposit of sand extending 1½ miles outside the Warren point in a line parallel to the opposite shore, and dries at low water to abreast of Orcomb point. This sand which narrows the entrance very considerably, limits the channel on the western side, and is marked by three White buoys besides the one on the Checkstone.

SWATCHWAY.—The bank which dries for a considerable distance to the eastward of Warren point, is named the Warren sand, and between it and the Pole there is an intricate but useful channel available at half tide for boats and even small vessels under 6 feet draught of water; but being very narrow, it ought only to be attempted by those well acquainted with the place and in fine weather, for with strong southerly winds, which almost always cause a swell outside, there is certain to be a heavy breaking sea on the Monster, an extensive shallow flat sand at its southern extremity. As this swatch, however, is of great utility for avoiding a long and laborious pull round the Pole, and against a strong ebb tide over the bar, the following marks are given as the best which can be used:—Keep the Ferry-house at Exmouth point in a line with the tangent of the high part of Warren point, until the Coast guard house near Gun cliff comes on with the south-eastern house on Beacon-hill; continue on this line until abreast of the Checkstone perch, then steer for Exmouth church, leaving the White buoy of the Checkstone on the starboard hand.

FAIR-WAY BUOY.—The marks for the fair-way buoy (Red with a Beacon) laid down in 5 fathoms water at a mile from the entrance, are:—Exmouth church in one with the south-eastern house on Beacon hill N.N.W. ½ W., and Mamhead tower just open to the northward of Langstone point W.N.W. ½ W. The tower

stands conspicuously on the high land to the southward of the Obelisk on Great Haldon hill.

ANCHORAGE.—A vessel may anchor anywhere near the fair-way buoy waiting tide according to her draught of water and state of the weather, keeping to the eastward or westward of the buoy, according to the direction of the wind.

The best anchorage within the points is on the western side of the harbour above the town, in the Bight, a hole of deep water and comparatively slack tide, formed on the low water sands on the western shore, and a high hard gravel bank called Bull-hill bank to the eastward. Two Black buoys are laid down, one near the south-western edge of the Bull-hill where it is steep-to, and the other near the south extreme of the shoal spit called the Ridge; and are 700 feet apart. The Ridge narrows the channel very considerably at this point.

DIRECTIONS.—In running for the entrance of Exmouth harbour, bring Exmouth church to bear N.N.W. ½ W., which line will be seen to cut the S.E. house on Beacon hill, as soon as the town can be distinctly made out, and will lead up to the fair-way buoy.

In approaching the entrance from the westward, after rounding Clerk point and a remarkably lofty needle rock outside of it called Clerk rock, the only outlying danger is the small rocky patch off Dawlish, over which there is not more than 11 feet at low water spring tides. It will be avoided by keeping Exmouth church well open of Warren point. Mamhead tower in one with the coast-guard flag-staff at Dawlish, bearing N,W. ¾ W., is the cross-mark for it.

Abreast of Clerk point, at half a mile from the shore, the fair-way buoy bears E. b. N., when it will be in a line with Straight point, and distant 4 miles.

Between Clerk point and Langstone point the low water rocks dry for more than a cable's length from the shore, with a gradually shelving bank outside of them.

A good turning mark up to the fair-way buoy is, to keep the whole of the town of Exmouth open of Warren point, and not to open Mamhead tower to the northward of Langstone point, which precaution will avoid the Pole and shallow flat sands to the westward of it; but the soundings are very regular, and a common attention to the lead, making due allowance for the rise or fall of the tide, will always afford a sufficient warning for vessels to go about when standing in-shore.

In approaching the entrance from the eastward steer for Straight point, which may be rounded with safety within a quarter of a mile; then keep Mamhead tower in one with the houses at Mount Pleasant (which lies a little to the northward of Langstone point) bearing about W.N.W. ½ W. This although a close mark, is a safe one with a leading wind for clearing the ledges between Straight and Orcomb points, and also leads well inside the fair-way buoy, and up to the fair-way mark for entering the harbour.

No stranger should attempt to run into the harbour without a pilot, who is always at hand, and above all, without a leading wind. If, however, they should be compelled to do so, there can be no better general rule than to leave all the black buoys on the starboard and the white buoys on the port-hand. This precaution will certainly avoid the shoals, but to affect it a frequent alteration of the course will be necessary; and therefore, as under any circumstances as little as 5 feet at low water must in all probability be crossed, it is not a bad leading-mark to keep the atmospheric chimney at Starcross (a tall and conspicuous red tower) on with Exmouth point, bearing N.N.W. ¾ W., which will lead to the westward of the first white buoy on the Pole sand, and up to the anchorage off the town.

With the intention to anchor in the Bight, the above course must not be continued farther than to have Orcomb point in one with the point below Gun cliff near the coast-guard station, which may be run with until the upper coast-guard boat-house, which is the first building to the northward of the baths, comes on with the ornamental villa called the Temple, remarkable from its Grecian design. These two in one will clear the Warren sand and the Ridge; and as soon as the low point of Orcomb is observed to be coming on with the Checkstone perch and the high tangent of Warren point, haul to the northward for the Bight, and anchor

by the lead anywhere to the westward of the two black buoys of the Bull-hill bank. A pool of deep water runs up from the Bight to Starcross, in which vessels may lie with 6 or 7 feet at low water; but as it dries at the upper end, there is no passage even for boats into the main channel at that time.

As Exmouth bar is not lighted, it can on no account be run for with safety at night.

TIDES.—Within the bar at Exmouth it is high water, full and change, at $6^h\ 21^m$, rise at springs 12 feet 3 inches, at neaps 8 feet 8 inches. At Topsham Lock it is high water 15 minutes later than at Exmouth; the rise at springs being only one foot less, and at neaps the same as in that harbour. At springs, the tide begins to rise at Topsham about one hour after low water at Exmouth, when it has risen nearly a foot at the latter place.

Soon after low water, the flood makes at the entrance, and sets fairly up the channel until the banks are covered, with a velocity of about a knot, increasing to 2½ knots abreast of the church, and to 4 knots off the Ferry point, where it may be said to have acquired its greatest strength, which decreases considerably as the Bull-hill bank is approached.

The ebb within the harbour turns with the tide by the shore, and for the first two hours sets across the Warren and Pole sands; over the former it runs 2½ knots until past Warren point, when its strength decreases, and it crosses the Pole with a velocity of little more than a knot. The stream turns to the eastward at this time of the tide, when free from the influence of the harbour shoals.

As the banks uncover at about 2½ hours ebb, the tide sets fairly through the channel with considerable strength, of at least 4 knots abreast of the Ferry; it crosses the outer end of the Pole sand with a velocity of about 1½ knots, but when clear of the shoals, it scarcely runs a knot.

During nearly the whole of the ebb or fall of the tide on shore, between the Bar and Straight point, the direction of the stream is E.S.E., when it meets and mingles with the rotatory tide at that point.

Off Exmouth bar, at three quarters of a mile, south of Straight point, at full and change, the stream turns to the eastward at 3^h 40m, and to the westward at $11^h\ 0^m$, running in the latter direction about 4¾ hours. The direction of the western stream for the first 2 hours is W.S.W.; for the next 2 hours west, and then turns gradually to the northward. The direction of the eastern stream for the first quarter is E.N.E.; at half-tide, E. b. N.; and the greatest velocity of both streams is about 1 knot.

DAWLISH is a small watering place lying between Exmouth and Teignmouth, and in 1851 its population was 2,671 persons. Dawlish rock lies half a mile off the town, the marks for which are given in the directions for approaching Exmouth.

TEIGNMOUTH lies halfway between Torbay and Exmouth, N. b. E. ½ E., 4½ miles from Hopes Nose, and 39 miles N.W b. W. ½ W. from the Bill of Portland. It has a small harbour with a bar which nearly dries at low spring tides, and is ever changing in consequence of the strong freshes in the river, and alternate southerly gales and still weather. From the Ness on the south side of the entrance to Ferry point on the north side, the distance across at high water is only a quarter of a mile.

The Ness is a remarkably beautiful headland of red sandstone clothed with verdure, rising boldly from the water's edge to the height of 174 feet. Ferry point, which terminates the promenade called the Denn, is a long low tongue of loose shingle, altering in shape and extent every gale of wind.

A LIGHTHOUSE has been erected inside the Ferry point on the S.W. end of the Denn, bearing a Fixed Red Light, which may under favourable circumstances be seen at a distance of six or seven miles. The top of the lantern is 37 feet above high water, and the centre of the light about three feet lower.

This light serves to point out the position of the harbour at night, and as it is almost useless as a guide for crossing the bar, a small Shifting Red Light has been placed in one of the houses behind it. The two lights in one clear the rocks off the Ness, and also the highest part of the Pole Sand; and lead up to the fair-

way, the approach to which can alone be estimated by the appearance of the land and an attention to the lead.

The CHANNEL, which lies between two sands uncovering to a considerable extent, is nearly straight, and about 300 feet wide at low water, the greatest depth being on the south side.

The north sand is by far the most extensive, and has acquired the name of Spratt sand; and the high head of fine shingle which is heaped up near the outer end of it, but which alters according to the state of the weather is called the East Pole. The Pole or Ness sand, which is on the southern shore, dries a good quarter of a mile outside the point.

There are no rocks on the north side of the channel, but considerable masses of large loose blocks of red sandstone extend the whole way round the Ness up to the anchorage in Shaldon Pool, the limits of which are imperfectly pointed out by rough Buoys painted Red, placed just within the outer edge of them. The western patch is called the Bench rocks.

As the bottom is entirely free from rocks at the entrance, a vessel may anchor anywhere outside the bar according to her draught of water; but it may be well to observe that the shoal water lies a long way outside the sand heads, and as little as 12 feet may be expected the third of a mile from the Ness. To insure 18 feet at low water, Berry head must be kept open of Hopes Nose, which will lead a good half mile outside the sand heads, and be found a safe turning mark for a stranger between Torbay and the harbour.

DIRECTIONS.—It would appear unnecessary to warn strangers against trusting to Teignmouth for refuge in bad weather, for there cannot be a more dangerous position to be taken by surprise in than off the Bar. The ground-swell which generally precedes a southerly gale soon becomes a heavy breaking sea as the wind blows home, which it frequently does very suddenly; and then, if unable to take the bar, which would be attended with much danger and difficulty, the only alternative is to secure an offing as quickly as possible, bearing in mind that no shelter whatever is to be found between Dartmouth and Portland roads.

As the sands shift so frequently, it would be unsafe to recommend any leading marks that may with certainty be depended on at all times; but as no buoys are laid down to mark the channel at the entrance, it may be stated that the south arch of the bridge, or the junction of the staging with the masonry, which is very distinct, just shut in with the outer end of the Ferry point, will lead over the bar, and towards the Spratt sand. This course should be continued until the light-house is in one with the coast-guard flag-staff; then haul over for the Shaldon shore, steering for the southern house in Shaldon until the north-west house or tangent of the houses comes on with the arch referred to above, which line will lead up to Shaldon pool in mid-channel, and abreast of the fairway buoys on the starboard hand. From thence the channel to the moorings off the town, where vessels may ride in from 10 to 12 feet at low water, is marked by seven buoys on the edge of Salty flat, viz., four Red, one striped Black and White, one Black, and one Red, all of which must be left on the port hand. A large barrel buoy (Red) is placed at the Ferry point; but as the sand at low water dries for a short distance outside of it, it is necessary to give it a tolerable berth in rounding the point. There is room for a few small craft in Shaldon pool, where they may anchor out of the way of vessels entering the harbour; the best berth is abreast of the south end of the town a little above the Bench rocks, where the tide is not so strong as in the channel.

Apart from the attractions of Teignmouth as a favourite watering place, with its railway station in the heart of the town, it is fast becoming a port of considerable commerce. It is no unusual circumstance to see 30 or 40 vessels, some of considerable tonnage, and one or two steamers, in the harbour at the same time, with the great convenience of having a steam tug attached to the port.

Navigation for vessels of any size may be said to cease at the bridge, although there is a swing opening through which vessels drawing 11 feet may pass at high water spring tides; it is not however much used, the principal part of the traffic above it, which is considerable, being carried on in barges; but for these, and

even small vessels, there is water communication the whole way to Newton, and a channel has been cut, straightened, and buoyed for the purpose.

TIDES.—It is high water at full and change in Shaldon pool at 6h 0m; rise at springs 13 feet, neaps 11 feet. Outside the bar the time of high and low water is about 25 minutes earlier, and there may be 6 inches more rise and fall; but at the bridge and at Combe cellars it is much the same as in the pool.

On the bar, the flood stream makes into the harbour nearly half an hour after low water by the shore, and before the banks are covered sets up the channel with a velocity of from three quarters to 1½ knots; but as the tide rises, its direction is over the Spratt sand, which should be allowed for when working into the harbour in light winds.

The tide has no great strength until near the Ferry point, which from half tide to nearly high water it sweeps round with a velocity of from 4 to 5 knots, causing strong eddies and counter tides near the beach on both sides. Inside the harbour the first part of the flood follows the trend of the channel; at half tide it sweeps over the east end of Salty flat; and at and near high water it makes nearly a straight course from the Ferry point to the bridge with a velocity of from half to 1½ knots.

In much the same way the course of the ebb stream depends entirely upon the depth of water over the banks. From the bridge the first quarter ebb runs over the low part of Salty flat for Shaldon pool; but as the tide falls, or a little after half ebb, it drives through the channel with considerable velocity, much influenced by the quantity of fresh water in the river. Under ordinary circumstances the average velocity is as follows:

From the Swing bridge to the moorings, 1 to 1½ knots; below the moorings, 3 knots; at the Ferry point, 5 knots, slacking immediately after passing the Ness; and over the bar, from 1 to 2½ knots.

There is no eddy on the ebb on the western shore below the Bench rocks, as the true stream runs close past them, as it does also on the opposite side near the Ferry point. On the bar the first and second quarters of the ebb set about E.N.E., after half tide S.E., meeting the true tide a short distance outside the bar.

BABBACOMBE BAY affords good anchorage in from 4 to 5 fathoms, over a sandy bottom, sheltered from all westerly winds. From thence to Portland Bill there is exposed anchorage off all the small towns, sheltered only from northerly winds.

BERRY HEAD is nearly a perpendicular cliff of limestone 180 feet in height, with a flat or table summit, and may be seen at the distance of 7 or 8 leagues. On its northern face are limestone quarries, that have been extensively worked.

TORBAY.—Round Berry head lies Torbay, affording spacious and good anchorage in 6 or 7 fathoms over mud and clay, and sheltered from all winds from N.E. (round by the north) to S. b. W., and even to S.S.E. if a berth is taken up well in-shore, on the southern side of the bay. The bay is open to the eastward, and south-easterly gales send in a heavy sea.

There is a small Fixed Red Light placed on an iron stand, 20 feet above high water, on the pier head at Brixham; a Fixed Red Light is also exhibited on the pier head at Torquay, 15 feet above high water, and may be seen in clear weather at about 5 or 6 miles.

RIDGE.—The only foul ground in the bay is the Ridge, a rocky patch, small in extent, with 3¼ fathoms water on it. The marks for it are, the Thatcher on with Hopes Nose, bearing N.E. by E. ½ E.; and Smoky House mill (a ruin) on with the western fall of the Red cliff on the southern side of Roundham point, N. by W. ¼ W.

BRIXHAM.—The small fishing town of Brixham stands on the southern side of Torbay, at 1¼ miles from Berry head. The pier harbour dries at low water, but it has from 9 to 12 feet in it at high springs. The surplus harbour dues are applied to the formation of an outer pier or breakwater, called Albert pier. It is 1,500 feet to the eastward of the former piers, and in 1853 had been extended to 150 yards from the shore, affording much shelter to the smaller vessels an-

chored off the harbour. There are several shipwrights' yards at Brixham, and upwards of 20,000 tons of shipping belong to the port, besides a large fleet of trawlers. A large reservoir of fresh water has been formed by Government for the use of vessels at anchor in the bay, the pipes from which are led to the eastern pier head. The population in 1851 was 5,627.

PAIGNTON.—The small pier harbour of Paignton lies at the head of the bay on the northern side of Roundham point, and carries a depth of from 8 to 10 feet at high water springs, but dries at low water.

TORQUAY.—The pier harbour of Torquay, which lies in the N.W. angle of Torbay, has from 10 to 14 feet in it at high water springs, but it dries at low water. There is a considerable coasting trade to Torquay, and some Newfoundland trade. Its population in 1851 was 7,903.

ANCHORAGE.—With the exception of the foul ground of the Ridge, the whole of Torbay affords good anchorage. The favourite anchoring ground is in Brixham roads, where vessels are more sheltered from south-westerly winds, with Brixham church and fishing pier in one bearing about S.W., and Berry head between south and S.S.E. Large ships should not anchor farther to the southward than to have Paignton church on with Roundham point, bearing N.W. ¾ N.; nor farther to the westward than the high part of the Thatcher over the narrow neck of Hopes Nose, N.E. ¼ N. Should a vessel part her cables, and be obliged to run on shore, the proper place for doing so is in a small cove called the Elberry, which lies in the S.W. angle of the bay, and has a beach sheltered by rocks. By doing so, many crews have been saved, and the vessels subsequently got off; while others that were driven on shore more to the northward became total wrecks.

DIRECTIONS.—In entering Torbay from the southward, Berry Head, which is steep-to, may be rounded at any convenient distance. With the exception of Shoalstone point, which has a reef running a short distance off it, the whole of the south shore of the bay is clean, and the soundings regular.

In entering the bay from the northward, a vessel may if necessary pass between the Ore Stone and the Flat rock, which lie off Hopes Nose, as they are both steep-to on the passage side, which has from 5 to 9 fathoms water in it. A small rock lies half a cable's length from the south point of the Ore Stone. The Ore Stone open of the Thatcher, bearing E. ½ S., clears the rocks and foul ground on the northern side of the bay.

TIDES.—It is high water at Brixham, at full and change, at $6^h\ 18^m$; rise at springs, 14 ft. 7 in., at neaps, 11 ft. 4 in. At Torquay at 6^h; rise at springs 14 ft. 10 in., at neaps 11 ft. 6 in.

The COD ROCKS are two steep and rocky islets, 50 feet high. The outer one lies S. b. W. ¾ W. a third of a mile from Berry Head, and a quarter of a mile from the coast. There is no proper channel between it and the shore.

MUDSTONE LEDGE.—A rocky ledge called the Mudstone lies S.S.W. ½ W. a mile from Berry Head, and about half that distance to the eastward of Sharkham point, on the outward extreme of which are 4½ fathoms. Hopes Nose open of Berry Head N.N.E. ¼ E. leads to the eastward.

NIMBLE ROCK.—A little to the southward of Down-end point, and at about a third of a mile from the shore, lies a dangerous sunken rock, called the Nimble, having only 3½ feet over it at low water, with 6 to 7 fathoms close to. The marks for it are: the Start lighthouse on with the East Blackstone, and the N.E. tangent of Down-end point on with the highest part of Scabbacombe cliff. The Lighthouse open on either side of the East Blackstone, clears it.

The BOOTFIELD, a sunken rock, carrying a depth of only 9 feet, lies off the south-eastern extreme of Down-end point, at about 170 fathoms from the shore. The Bootfield (a projecting tongue of cliff half a mile to the southward of Sharkham point) open of Down-end point N.N.E. ¾ E., clears it to the eastward.

The EAST BLACKSTONE, a rock 10 feet high, lies S.W. b. S. a mile from Down-end point, and has no outlying dangers.

Between **BERRY HEAD and DARTMOUTH** the land is undulating and highly cultivated. Three conspicuous hills rise between them. That to the northward

rises from Sharkham point, the peak of which is 213 feet high, to a height of 490 feet at one mile from the shore. The next is at Scabbacombe, where the cliff rises to 420 feet; and that to the southward springs from Down-end point, the cliff of which is 200 feet high, and rises to 510 feet at half a mile from the shore. Between the Mewstone and Berry Head the shore should not be approached within half a mile, there being in this space several steep and dangerous rocks, having a depth of 6 and 7 fathoms in their immediate vicinity.

DARTMOUTH lies 5 miles to the S.W. b. W. of Berry Head, and its position may be recognized at sea by the granite Peaks or Tors, which break the outline of the Dartmoor range. The most remarkable of these are the Haytor and Rippon Tor, the latter being easily distinguished from the former by its single culminating point or cairn, while Haytor on the contrary presents a forked or jagged appearance. Rippon Tor, kept on the bearing of N. ½ W., leads to the entrance of the harbour, which, as the land is approached, will be more distinctly made out by the tall square tower of Stoke Fleming church, standing very conspicuously on the high ground about 1¾ miles to the westward of the harbour, and also by the no less remarkable rock islet, the Mewstone, three quarters of a mile to the eastward.

Although the entrance to Dartmouth is very narrow, not more than 220 yards from rock to rock, yet it partially opens out within the points into a safe and commodious harbour, of considerable capacity for ships of any size. Outside the points the character of the coast both east and west is a steep and broken rocky shore, dangerous to approach in boisterous weather, and fatal to be cast upon, without one yard of sand or shingle on either side for miles, on which a vessel could be safely reached.

The picturesque old church of St. Petrox, with the castle adjoining it, stands in bold relief on the brink of the precipitous rock at Battery point; and a single low square tower, the ruins of Kingswear castle, also near the water's edge on the opposite or eastern side. The sea face of the tower is kept whitewashed.

A large rugged rock called the Blackstone, 8 feet above high water, also lies a cable's length S. b. E. ½ E. from Blackstone point, and is a very useful object as a clearing mark for the shoals near the entrance.

LIGHT.—In the tower of Dartmouth castle, on St. Petrox or Battery point, is a Fixed Red Light, about 49 feet above high water, which is shown throughout the night, and may be seen in clear weather from about 7 miles.

A vessel seeking refuge in Dartmouth harbour in a gale between S.W. and S.E., if off the Start or to the westward of Dartmouth, should keep a good half mile off from the shore, and run to the eastward till the harbour opens out, which it will do on a N.E. b. N. bearing; continue on till Dartmouth Castle is in one with a large house in trees on Mount Boone above the castle, bearing N. b. W. ¾ W., which will lead in the fairway to near the Castle point; from thence steer midway between the entrance points and anchor in from 7 to 10 fathoms off Warfleet cove at about a quarter of a mile within the entrance. At night keep the Castle light on the above bearing and proceed as before. If to the eastward of Dartmouth with a south-westerly wind, then run for Torbay, the only secure anchorage between Dartmouth and Portland.

DANGERS on WESTERN SHORE. — There are many dangerous rocky patches which render the approach to Dartmouth somewhat critical to a stranger. It will be well, therefore, to point attention to their nature and position, with the best marks for avoiding them, before any general directions for sailing in and out of the harbour are given.

COMBE ROCKS.—Commencing to the westward at Combe point, attention must be drawn to a considerable cluster of rocks which lie immediately off the point, many of them at all times above water, and all of them showing themselves at low water.

The outside rock of this group, the Outer Combe, lies rather more than a cable's length from the shore and dries at half tide. When seen it may be approached without apprehension, having deep water all round it, and, indeed, at

all times in daylight, from its proximity to the Old Combe rock, always above water, and from which it is distant scarcely 300 feet to the eastward.

MAG or MICA ROCKS.—From the Outer Combe rock, in a N.E. b. N. direction, a succession of high heads show themselves from half ebb to low water. These are called the Mag or Mica, inside of which no vessel should venture. Kingswear castle open of Blackstone point N. E. ¼ N., clears them to the eastward.

HOMESTONE ROCKS.—A patch of rocks very dangerous even to small vessels lies a quarter of a mile E.S.E. from Combe point, leaving a safe channel of deep water between it and the Combe rocks. The highest head of the patch is called the Homestone, over which there are not more than 4½ feet at low water. The crossmarks for it are: Kingswear castle in one with the highest point of the Blackstone bearing N.E. b. N., and a high and remarkable needle rock at Combe point in line with Stoke Fleming church. Kingswear castle open of the Blackstone, clears it on either side; and Stoke Fleming church on with the extreme of Combe point, leads to the southward. A Buoy painted in Black and White Rings is laid down about 300 feet to the south eastward of the rocks.

SEVENTEEN FEET PATCH.—There is a considerable rise, with as little as 17 feet at low water, at about 380 feet N.E. of the Homestone buoy, which should be carefully avoided by ships of large draught. St. Petrox church open of Blackstone point N. b. E., clears it to the eastward.

PIN ROCK.—A formidable rock which seems to have escaped the vigilance of former surveyors lies a third of a mile to the eastward of the Homestone, highly dangerous to vessels of even moderate draught, as it lies exactly in their track in coming from the westward, or in working up to the harbour.

Captain Sheringham farther says:—"This rock is well known to the fishermen and pilots, and called by them the Pin, but even they were baffled in detecting the Pin's point, which we found extremely difficult to hit, even if we have now succeeded in doing so; but after a diligent search the highest point struck reduces the depth on it to 13 feet at low water. It will, therefore, be prudent not to rely too implicitly on the depth laid down in the chart, but if possible to give all such dangerous heads a wide berth."

The cross marks for the 13 feet are: the East Blackstone and south point of Mewstone in one, E. ½ S., and Dartmouth castle flag-staff in one with a white house in trees on Yarrow bank N. ¼ W.; the same house open of Battery point clears it to the eastward, and shut in with St. Petrox church, to the westward. There is a safe channel between the Pin and the Homestone.

The BLACKSTONE ROCK has been already described, but great care must be taken, when rounding it, to avoid a sunken rock which lies about 70 or 80 feet to the eastward of its eastern point. Although small vessels occasionally run between this rock and Blackstone point, it is attended with some risk, for a shoal head with only a depth of 5 feet on it lies nearly in mid-channel. The following observation, however, may perhaps be made, viz., that except the rocks off Blackstone point nothing dries at low water; and as there is a rise of 16 feet, they may at a push use this channel at or near high water, taking care, in doing so, to close the rock nearer than the point.

CHECKSTONE ROCK.—A group of rocks, some never covered, and most of them dry at low water springs extend a considerable distance from the shore a little to the southward of Battery point, and as the narrowest part of the channel is approached, the outer one, which is a sunken rock, called the Checkstone, with only a foot of water over it, greatly encroaches upon the fairway. A Black and White chequered buoy marks its position, but as there is as little as 13 feet water to the eastward of it, the buoy should not be too closely approached. Kingswear point touching Battery point N. b. W. ¾ W., clears it to the eastward.

A small detached rock near the castle, but too close in to be of much importance, completes the dangers on the western side of the entrance from Combe point to the anchorage.

DANGERS ON EASTERN SHORE.—The outlying dangers on the eastern

shore of the entrance to Dartmouth are scarcely less in number and importance than those which have just been described on the western side.

The MEWSTONE, a rocky islet rising 125 feet above high water, lies about 1½ cables' length off the eastern point of Dartmouth Range. It is steep-to on its eastern side, but the channel between it and the shore should never be attempted. If from want of caution a vessel should be carried through it by the tide, she must be kept as nearly as possible in mid-channel, as the rocks dry off for a considerable distance on both sides.

VERTICAL ROCKS.—Exclusive of the Mewstone and the many high rocks to the westward of it, a chain of very dangerous rocks, some showing themselves at low water, extend parallel with the coast a full quarter of a mile due west from the Mewstone. They are named the Verticals, from their high and precipitous sides.

The WEST ROCK dries at very low tides, and as there is a considerable rise of the ground a good cable's length to the westward, with only 24 feet water on it, it will be prudent, from the very suspicious nature of the ground, and the set of the flood tide, to give it a wide berth. Kingswear castle open of Inner Froward extreme point N.N.W., leads to the westward. The water suddenly deepens, to the southward of the Verticals, into 10 fathoms; the lead, therefore, is a very insecure guide, but in daylight a good clearing mark is, to keep the East Blackstone well open of the Newstone E. ¼ N., which will also lead to the southward of all the dangers off Dartmouth. The East Blackstone, the Mewstone, the very high rock near it south of the Shooter, the Verticals, the Pin (nearly), the Homestone, and the rocks at Combe Point, lie in a line; as do also the Mewstone, the Shooter, the Bear's Tail, the Castle Ledge, and the Blackstone.

BEAR'S TAIL ROCK.—Rather more than half a cable's length to the southward of Outer Froward point lies a single rock called the Bear's Tail, which dries at low water; but as it is so entirely out of the proper track of vessels, it needs no further allusion to than to point out as a warning to very small vessels, or boats intending to run between the Mewstone and the shore, that Kettle and Inner Froward points in one lead over it, as do the highest peaks of the Shooter and Mewstone.

OLD CASTLE ROCK.—A patch of sunken rocks lies a full quarter of a mile to the westward of Outer Froward point, with a good channel for small vessels inside of it. On this patch, however, there are several shoal heads, two of which require to be particularly noticed. The inner head is called the Old Castle rock, and has only 4 feet water over it; the ruins of the old castle at Dartmouth, which stands at the southern end of the town touching Battery point, leads directly on it. The outer head is known as the Castle Ledge, and has only 8 feet over it, and lies 300 feet inside the Black Buoy, which is laid down to mark its position. The mark for the ledge is, the peak of the Mewstone in one with the right tangent of the Shooter. The same peak open of the Shooter, clears it to the southward; and the Castle Flag-staff on with Sir Henry Seale's house on Mount Boone, or Battery and Kingswear points touching N. b. W. ¾ W., leads to the westward. The latter is the fair-way leading-mark up to Castle point, and leads to the eastward of the Checkstone. Beacon hill in one with Kingswear castle and outside Inner Froward point, bearing N.N.W., clears the tail of the Verticals and the Bear's tail, and leads inside Old Castle rock.

KETTLE POINT.—From Castle Ledge to Kettle point all is clear and the shore bold, but off the latter point lies a small sunken rock, with only 3 feet water over it, and also the Kettle rock, which dries at low water. The latter is inside the point, and the former not more than 60 feet from the shore.

The RANGE is a valuable roadstead of considerable area, within Blackstone and Froward points, and affords good shelter as an occasional anchorage. The holding ground is excellent, and the water of an easy depth, with very little tide, but as it is open to winds from E.S,E. to S.S.W., it ought on no account to be depended upon for refuge. With strong southerly winds on an ebb tide, the sea breaks heavily across this roadstead; and indeed there is generally a heavy swell,

with anything like bad weather, in the offing. If caught there with the wind in, and blowing hard, a vessel has no alternative but to slip and run into the harbour.

Two pilot smacks belong to the port, and many experienced pilots are constantly on the alert, but it would be well to make the signal for one in good time, as they reside in the town, and some time must elapse before they could get out to a vessel's assistance in a case of emergency.

ANCHORAGE.—There is good anchorage anywhere above Gun point, the usual place being near the town off the New Grounds in 22 feet water, which is the best if a vessel is to remain any time in the harbour, and the most convenient for obtaining supplies, being entirely out of the way of vessels entering; but if the harbour is only resorted to for temporary shelter or for the sojourn of a day or two, the anchorage lower down is to be preferred, in 7 to 10 fathoms between Old Dartmouth castle and Warfleet cove, from which position it will be comparatively easy to get to sea on a flood tide, when it would be scarcely possible to do so from the upper anchorage.

SUPPLIES.—No port can possibly afford greater facilities for abundant and cheap supplies than Dartmouth. Plenty of excellent water, easily procured; experienced shipwrights, good building yards, with patent slip, &c.; and, as there is a rise of tide of 14 feet, great convenience for steamers to coal alongside the New Ground Quay, which only dries at low water spring tides.

DIRECTIONS.—The fair-way leading mark up to Battery point is, the flagstaff on Dartmouth castle in one with Sir Henry Seale's house on Mount Boone, or Battery and Kingswear points touching, bearing N. b. W. $\frac{3}{4}$ W.

Considerable difficulty is frequently experienced in getting in and out of Dartmouth, partly owing to the perplexing eddies at the entrance, but more particularly from the baffling eddy winds which blow off the high lands, sometimes with considerable violence, especially if the wind be to the westward of N.W., when it really requires all the attention of a skilful pilot. N.W. and S.E. are the true winds, and as a general rule, it may be said that in moderate weather, with the wind between N.W. b. N. and N.N.E., and S.W. and S.E., a vessel will be found pretty well under command.

There is a safe channel between the Combe rocks and the Homestone, which under some circumstances may be used with advantage, particularly with scant westerly winds.

Although a vessel must be over 13 feet draught of water to touch the Pin, in daylight it is so easy to avoid it by an ordinary attention to the marks that it would be quite inexcusable to run any risk.

The greatest caution should be observed, particularly in light winds, in leaving the harbour when bound to the eastward, not to be caught by the flood tide near the Outer Froward point, as a vessel would be very likely set either inside the Mewstone or on the Verticals. In most cases, without a commanding breeze, a dull sailer would have to trust to her anchors in very foul ground. When the East Blackstone is open to the southward of the Mewstone, safety is pretty certain, and the latter islet may be rounded to the southward within a ship's length.

Turning in or out of the harbour with baffling flaws, the truest wind will be found on the opposite side of the Range from which it blows.

At night strict attention must be paid to the bearings of the light; when opened in coming from the westward on a N. b. E. bearing, a vessel will be clear of the Homestone; when bearing N. $\frac{1}{4}$ W. it will lead over the Pin; and by not bringing it to the westward of N. b. W. $\frac{1}{2}$ W., the Castle Ledge will be avoided.

A stranger should not attempt to work into the harbour (particularly at night) in a vessel of any size without a pilot; but by attending to the marks in the daytime, with a fair wind, or in a steamer, and at night by keeping the light bearing N. by W., there can be no great risk in running in almost in any weather.

The river above Dartmouth is winding and intricate, and only used by vessels drawing less than 10 feet; for navigating between its banks and shallows, local experience is the best guide. It will, therefore, only be requisite to notice the Anchor-stone, a half-tide rock, $1\frac{1}{2}$ miles above the town, which lies in a direct

line between Ditsham Rectory boat-house and Greenway boat-house, one third over from the west bank; on its western side, are 8 feet water, and on its eastern side 12 fathoms.

TIDES.—It is high water by the shore on full and change days at Dartmouth at $6^h\ 16^m$; the rise at springs is 14 feet 10 inches, and at neaps 11 feet 2 inches. At Ditsham it is high water 6 minutes later than at Dartmouth; rise at springs 14 feet 1 inch, and at neaps 4 feet 11 inches. At Totness 24 minutes later than at Dartmouth: rise at springs 10 feet 9 inches, and at neaps 4 feet 4 inches. At the Blackstone and at the Castle Ledge buoy, or anywhere within the range, the stream turns with the tide on shore, but at the Homestone about two hours and a half later.

From half a mile to a mile outside the Homestone, the flood sets to the southward of the Mewstone; but at the Homestone its direction is about E.N.E. for the Inner Froward point until within a few yards of the shore, gradually becoming weaker as the land is approached. From thence it turns to the southward, running close in-shore inside the Castle Ledge, acquiring strength as it rounds Outer Froward point, which having passed, it sweeps to the eastward inside the Mewstone with a velocity of from 1 to 2 knots.

At the Castle Ledge buoy, the first of the flood by the shore sets about S.E. b. E. direct for the Verticals, and meets the last of the channel ebb as soon as those rocks are passed. The flood splits at the Blackstone rock, anywhere within which it curves gradually outside the Checkstone buoy towards the entrance, and runs sluggishly until within the points.

The principal eddy on the flood is that which runs along the eastern shore round the Froward points, but there is also a slight eddy running down close to the rocks between Brook hill and Kettle point. Along the western shore there is very little tide on the flood outside the harbour, but a strong eddy runs inside the point, which commences two hours after low water by the shore from the coast guard station to Gun point.

The ebb sets obliquely across the harbour, from the ferry slip at Kingswear towards the coast guard station, which stands in the bight about half-way between the town and Gun point, from whence it runs out between the points, and sets in a southerly direction until past the Castle Ledge, where it is met by the offing ebb, with which it mingles, and is deflected to the westward running outside the Homestone.

There is a strong eddy on the ebb in the bight from Kittery corner to abreast of Gun point, of which the pilots are glad to avail themselves in light southerly winds, when it would be difficult to reach the anchorage without it. A weak eddy will also be found between Gun point and St. Petrox, but it extends only a few yards from the shore. Both the strength and breadth of the eddies depend much upon the velocity of the stream, ever varying according to the state of the tide and the freshes in the river, and which require at all times much caution and a pilot's experience when entangled in them.

The START POINT.—may be well known from its rugged cock's-comb-like appearance; the hillocks on its ridge within the lighthouse are five in number, each about 200 feet in height. Peartree Head, within the point, rises to 386 feet.

There are no dangers in the vicinity of its projecting points to the south and S.W. except the Pear Tree, the Start, and Cherrick rocks; the latter lies S. ¾ W. upwards of 2 cables' lengths from the point, and is just awash at low water springs. A sunken rock, with only 12 feet over it, also lies at the same distance due east from the lighthouse; to avoid it a vessel should not shut in the village of Hall Sands with the Start point, until the Pear Tree rocks open out to the southward of the Start rocks, when, by giving the latter a berth of about 2 cables' lengths, she may proceed to the westward.

A LIGHTHOUSE has been erected upon the Start at 140 yards from its extreme point; it is a stone tower 94 feet high, exhibiting a powerful Revolving light, at an elevation of 204 feet above high water, and showing a Bright flash every minute to seaward, till it comes to the bearing of W.S.W., on which it is

eclipsed, and may be seen in clear weather at the distance of 19 miles. A Fixed light is also shown in the same tower, 192 feet above high water, in the direction of Berry Head, visible only when the Start point bears W. ¼ S. and S.W. b. S., to guide vessels to Dartmouth and the Berry Head.

SKERRIES.—To the north-eastward of the Start lies a dangerous bank of pulverised shell and fine gravel, called the Skerries. From its southern extremity Start lighthouse bears W. ¼ N., four fifths of a mile; it thence extends N.E. b. E. ¾ E. 3½ miles, with an average breadth of half a mile. Near its south extreme are only 9 feet water, and on the other parts from 2 to 4 fathoms will be found, with deep casts between them; it terminates to the north-east in a sandy knowl, nearly a mile in length, with only 3 fathoms on its shoalest part. Berry Head open of the Down-end bearing N.E. ¼ E. clears to the eastward; Street church on with the highest part of Street Head cliff, and a little open of the north end of Slapton beach N.N.W. ½ W., leads to the northward; Mewstone peak just open of the high land of Down-end point N.E. b. E. ½ E. clears its western side; the west end of trees over Widdecomb house in one with the northern White house in Bee sands, N. b. W. ¼ W., clears its south-west end; and the Prawl open of Start point W. ½ N., leads to the southward.

To avoid the Skerries at night, a vessel should not approach them within 20 fathoms water; and in coming from the northward, if wishing to run to the westward of them, she should keep the Fixed light on a S.W. ½ S. bearing and pass the Start at a distance of a quarter of a mile on its northern side, and half a mile on the southern. When the Start light bears N.W. b. W. ½ W., she will be to the southward of the Skerries.

START BAY may be distinguished by a beach 5 miles in length from Hall sands to Street head. In the whole of the bay, within the clearing marks for the Skerries, vessels may anchor in from 7 to 8 fathoms, over a bottom of sand and gravel; excepting within half a mile of the Start point, where the ground is rocky, and the tide, which directs its course to the southward nine hours out of the twelve, might set a weak handed vessel on shore, in getting under way, before she is fairly under canvas. The Start point shelters with the wind to the westward of S.W., but if in a gale it should veer to the southward of S.S.W, vessels should immediately weigh and run for Dartmouth or Torbay, as a heavy sea is thrown into the bay by south-easterly gales. A vessel anchoring in the northern part of the bay, must be careful to avoid a sunken rock called the Earlstone which lies a good half mile W.S.W. ½ W. from Combe point, having a depth of only 3¼ fathoms over it. The Outer Combe, a rock 11 feet above high water, on with the Blackstone rock at the entrance to Dartmouth, bearing N.E. b. E., leads to the eastward of it; and the Boat house in the centre of Blackpool bay well open of Stoke point W.N.W., clears it to the southward.

START BANK.—S. ½ W. from Start point there is a bank of 8 or 9 miles in length, and 3 in breadth, and trending N.E. and S. W.; and though there are not less than 29 fathoms on any part of it, the agitation there is very strong during spring tides. Ittor rock in one with Stoke Fleming church will lead over the north-eastern end in 30 fathoms water, and the same rock in one with Start point will lead over the south-western end in the same depth. The soundings off the Start are somewhat irregular; there are from 2 to 3 fathoms more water near the land than in the offing, and farther southward the depth again increases, in the same proportions nearly. This is presumed to be the effect of the tide, which has also caused the formation of the Start bank.

START TO BERRY HEAD.—From the Start towards Dartmouth the sea shore is generally low, rising very gradually into the interior; particularly in the vicinity of Stoke Fleming, the view from thence eastward terminating at the Berry Head, which is the southern boundary of Torbay.

DIRECTIONS.—A vessel, in proceeding from the Start to Berry head, should keep the latter open of Down-end point bearing N.E. ¼ E. to clear the Skerries; and when abreast of the Mewstone, by keeping Hopes Nose (the northern point of Torbay) open of Berry head N.N.E. ¼ E., it will clear all dangers between the Mewstone and Berry head.

TIDES.—Between Dartmouth and Berry head the stream turns in-shore an hour earlier than in the offing, advantage of which may be taken by those well acquainted with the coast, when working along the land.

DIRECTIONS.—From any position off Portland to a corresponding one off the Start the course is west a little northerly, and the distance between those two headlands is 49 miles; and from any position off St. Catherine point to a corresponding position off the Start the course is about W. b. N., and the distance between the points 93 miles. By altering the courses successively between the meridians of the different headlands, as a vessel advances down or up the channel, she will better counteract the direct effects of the stream. When navigating between the Start and Portland, do not approach the shore within the depth of 30 fathoms until the meridian of Portland is passed, and, when between Portland Bill and St. Catherine point, go not into less water than 25 fathoms. The former precaution will keep a vessel to the southward of the Shambles and the Race, as well as in the fair stream of the tide; and the latter will prevent her from experiencing the strong indraft caused by the flood running into Christchurch, the Needles, and Freshwater bays, the duration of which is considerably prolonged by southerly and south-westerly winds. The depths of water, however, to the south-westward, southward, and south-eastward of the Casquets, within the supposed radius of 3 leagues, do not materially differ with those in similar directions from Portland, so that it is possible in bad weather, under a combination of disadvantageous circumstances, for the former to be mistaken by a stranger for those of the latter, particularly if hazy weather intervene, so as to prevent the revolving lights of the Casquets from being distinguished, unless indeed soundings were accidentally struck on a bank which lies S.S.W. from the Casquets. For it must be recollected, that there are six different positions in which the *three* lighthouses on the Casquets will appear as *two* only,* the first of which is only removed two points from the bearing of those on Portland, viz., N.W. ¼ W. or S.E. ¼ E., E. ¼ N. or W. ¼ S., N.E. ¼ E. or S.W. ¼ W.; 2ndly, that the variation in the distance from the Lizard to Portland, and from the Lizard to the Casquets, does not exceed 7 or 8 miles; and lastly, that this is the narrowest part of the Channel westward of Beachy Head. Should a stranger, therefore, be placed in such a predicament during a winter's night, between the periods of low water and three quarters flood, with a gale between N.W. and S.W., the consequences may easily be anticipated. This is a strong and unanswerable argument for a uniform and constant progressive attention to the lead from the instant of first striking soundings, by which such a disastrous situation can alone be successfully avoided. The Casquets bear from the Start point S.E. ⅛ S., distant 57 miles, and from the Bill of Portland S. b. W. ¼ W. 47 miles.

CHANNEL ISLANDS INDRAFT.—The action of the indraft in the great bight between Normandy and Bretagne, on vessels bound up and down channel, is by no means so universal as is imagined. Between 5 hours' flood and low water (7 hours out of 12), the whole body of water contained in the bight between Cape de la Hague and Brehat island sets out thence to the north-westward, more northerly along the coast of Normandy, and more westerly along that of Bretagne; and the nearer the islands are approached the stronger will be experienced the indraft, as well as the outset; but there is neither southing nor easting in the course of the tide, except between low water and 5 hours' flood. There is, therefore, no room for apprehension, except during that period when the stream sets southerly, south-easterly and easterly, with great velocity, extending its influence between Guernsey and the Start, nearly half channel over, and as far westward as the meridian of the Ile de Bas.

TIDES.—At a third of a mile E.S.E. of Peverel point, at full and change, the western stream makes at $8^h\ 40^m$, and the eastern stream at $4^h\ 0^m$, the former setting S.W. and the latter N.E.; on the ebb there is a dangerous race over the

* They are all three of equal height, being 81 feet above high water, and revolve every 20 seconds.

Ledge, which extends about a mile off the point. The velocity of the ebb stream is about 3 knots, and that of the flood about 1½ knots. Off Old Harry at three quarters of a mile N.E. b. E. of Standfast point, at full and change, the western stream makes at 9h 45m, and the flood or eastern stream at 4h 10m, the flood setting from N.E. b. E. to N. b. E. at the rate of 1 knot, and the ebb from S. b. W. to S.W. 2 knots.

At 1 mile S.E. of Durlston Head, at full and change, the western stream makes at 10h 25m, and the eastern stream at 4h 25m, the former setting W.S.W., and the latter E.N.E.; their greatest velocity being about three knots; the indraft of the flood stream in thick weather might prove fatal to a ship not on her guard.

S.S.W. ½ W., 1½ miles from St. Albans' Head, the western stream, at full and change, makes at 10h 45m, and the eastern stream at 4h 45m; the flood and ebb are of equal duration, the former setting S.E., and the latter from W.N.W. to N.W. b. W.; their greatest velocity being at half tide from 4½ to 4¾ knots.

In Portland and Weymouth roads there is very little tide, so that the stream is scarcely sensible, and continues to be very moderate along the shore from Weymouth to St. Albans' head.

At the Bill of Portland it is high water at full and change at 6h 46m; springs rise 8 feet 6 inches, neaps 6 feet 6 inches; at the Breakwater at 6h 56m,; springs rise 7 feet, neaps 4 feet 5 inches.

In West Bay, at 2 miles N.N.W. of the Bill of Portland, at full and change, the tide begins to turn at 6h 35m, and sets as follows:—1st hour of the ebb by the shore, at Portland Breakwater, S. ½ E., 1¾ knots; 2nd hour, S. ½ W., 1¾ knots; 3rd hour, S. b. W. ½ W., 1½ knots; 4th hour, S.W. b. S., three quarters of a knot; 5th hour, N.W., ¾ N., nil; 6th hour, from N.N.W. to N. ½ W., three quarters of a knot; 7th hour, N.N.E. to E. b. N., 1 knot; 8th hour, S.E. ¼ E., 1¼ knots; 1st hour of the flood, S.E. b. S., 1½ knots; 2nd, 3rd, 4th, and 5th hours, S.S.E., 2 knots.

At 2¼ miles S.E. ½ S. off the Bill of Portland, near the west end of the Shambles, the 1st hour of the flood by the shore sets west, at the rate of 1¼ to half a knot; 2nd hour, E. ½ N., half a knot; 3rd hour, E. b. N., 2¾ knots; 4th hour, E.N.E. ¾ E., 3¾ knots; 5th hour, east, 3¾ knots. At the 1st hour of the ebb, E. b. S., 3½ knots; 2nd hour, E. b. S. to S. E. b. S., 2½ to 1½ knots; 3rd hour, south, 1 knot; 4th hour, S. W. b. S. 1½ knots; 5th hour, W.S.W. ½ W., 1½ knots; 6th hour, W. b. S., 2 knots; 7th hour, W. b. S., 2¼ knots; 8th hour, W.S.W. ¾ W., 1¾ knots. N.B.—About a mile south of the Bill, at half flood, by the shore, the tide sets from S.S.E., to S.E. ½ E., and the opposite stream about W.S.W. ½ W.: the velocity of both streams, at springs, is from 5 to 6 knots; but although the tide runs with such violence near the Race, about a mile S.W. of the Bill, the tide was found very weak.

At 5 miles E.S.E. of the Bill of Portland, near the east end of the Shambles, the 1st hour of the flood by the shore sets west, 1½ knots; 2nd hour, from west to N. b. E., very weak; 3rd hour, about E.N.E., very weak; 4th hour, E. b. N., 2 knots; 5th hour, E. b. N., 2¾ knots. The 1st hour of the ebb sets E.N.E., 3½ knots; 2nd hour, E.N.E., 3¼ knots: 3rd hour, east, 2¾ knots; 4th hour, east and E. b. N., 1¼ knots; 5th hour, east, N. b. W., and W. b. N., very weak; 6th, 7th, and 8th, about west, from 2¾ to 2¼ knots.

About 2½ miles west of Portland Bill the flood and ebb streams are nearly of equal duration, setting S.S.E. and N.N.W. The flood stream ends about 10 o'clock, which is about 3½ hours after high water in Weymouth harbour; or 1h 41m before high water in Portsmouth harbour. At 5 miles W.S.W. from the Bill the streams are also regular, but they set S.E. b. E, and N.W. b. W. and turn an hour later, or 30m before high water in Portsmouth harbour. The streams are also regular at 6 miles S.S.W. of the Bill, setting E.S.E. and W.N.W. Here the eastern stream changes only 10m before high water in Portsmouth harbour.

Three miles south of Beer Head, the stream turns to the westward at 10h 30m at full and change, and runs in that direction 4 hours, then gradually turns to the northward and runs for 2 hours between W.N.W. and N.E. b. N. It may be said to turn to the eastward about 5 o'clock, and for 2½ hours, or until half tide,

sets from N.E. to E. b. N., and for the next three hours gradually turns to the southward. The direction of the tide in this position is, therefore, round the compass, with little or no velocity, as even at springs it scarcely runs a knot, and that only for a very short period.

It is high water, full and change, at the Start at $6^h\ 10^m$; springs rise 14 feet 8 inches, neaps 6 feet 6 inches. At the point and in the offing the stream makes to the westward three hours after high water by the shore, or at $9^h\ 0^m$, and to the eastward three hours after low water, or at $3^h\ 0^m$, the greatest velocity being at the time of high and low water, and is as follows:—off the Start 3 knots; north end of Skerries and the Down-end point, 2½ knots; and off Berry Head, 2 knots. When blowing fresh there is a strong race, both on the flood and ebb, from Start point to three quarters of a mile off shore. In Start bay the tides are weak and irregular, their general direction, nine hours out of the twelve, being to the southward, close to the shore, with the velocity of about a knot.

SALCOMBE HARBOUR, though very narrow all the way up to the town, is nevertheless capable of affording good shelter to vessels under the draught of 11 feet; a Bar of sand, however, which stretches across the entrance, presents an obstacle to its being a place of general resort. The entrance lies between the Praul point and Bolt Head; and immediately under the high land of the latter stands Salcombe Mewstone. The point of land next north-east of the Mewstone is distinguished by a peculiarly shaped rock called the Eelstone; and one quarter of a mile within the latter, the Bar begins, on which, at low water springs, the depth does not exceed 4 feet.

DIRECTIONS.—The considerations to be attended to by vessels bound into or out of Salcombe are, the state of the tide, their draught of water, and the effect of the ground-swell, from which the Bar is seldom wholly free. The period of half flood is the best time to attempt the passage, when there will be 12 feet on the shoalest part of the Bar. When running in, keep one third nearer to the western than to the eastern shore; and in order to pass to the westward of the shoalest water on the Bar, shut in the Mewstone nearly behind the Eelstone. On passing the Bar by this leading mark a small white thatched house resembling a lodge, standing upon the declivity of the hill to the westward of Woodville, must be kept its own breadth open to the westward of Fort Charles, in order to pass between the Wolf rock and the Poundstone; and from thence the south-eastern angle of Ivy cottage in one with the north-western angle of a remarkable white triangular garden-wall will lead between the Blackstone and Old Harry rocks; having passed which, keep in mid-channel, and anchor where convenient before you get abreast of the town. There is a channel between the Wolf and the eastern shore, but it is narrow and seldom used. When going through it, endeavour to keep mid-channel. The tide of both ebb and flood sets into and out of Salcombe according to the trend of the shores on each side, for which allowance must be made.

SUNKEN ROCK.—A small sunken rock with 9 feet water on it, lies about three quarters of a mile to the eastward of the Eelstone, of which care must be taken when beating into Salcombe. The leading marks, however, which have been given will clear it a long way to the westward.

HAM STONE, and GREGORY.—A small ledge of rocks, called the Ham Stone, and the Gregory rock, lies a quarter of a mile off the shore in a N.W. b. W. direction from the Bolt Head, with only 4 feet upon it at low water. The Praul signal-house open to the southward of the Little Mewstone at Salcombe will lead a quarter of a mile to the southward of it.

STOKE POINT.—A sunken rock with only 3 feet on it at low-water springs lies about one third or one half mile S.W. b. S. from the bluff of Stoke point: there are 11 fathoms close to its south side, and a passage within it. The town of Cawsand kept open of the Mewstone N.W. b. N. clears it to the southwestward.

The EAST RUTS is a patch of sunken rocks, lying nearly in the fairway of vessels bound into Plymouth Sound from the eastward. It lies S. b. E. ¾ E. 7 miles from the Mewstone, N.W. b. W. ½ W. at nearly the same distance from *the* Bolt Head, and E. b. S. 11¼ miles from the Eddystone. A sudden rise in

the land inside the Praul point in one with Bolt Head, though distant, is a tolerably good mark for this patch in one direction; no cross mark can be given capable of being taken up by a stranger. The peak of the Mewstone, however, in one with Maker tower, N.N.W. ¼ W. will lead nearly a mile to the eastward of it; and the same peak in one with Stoke block-house and the fall of the land at Reny and Staddon points, will lead 2 miles to the westward. There are only 22 feet on some parts of this patch at low water, but from 16 to 20 fathoms all round it.

The ENTRANCE to PLYMOUTH SOUND lies between the Mewstone and Rame Head; the former is a huge, precipitous rock, in a south-westerly direction from Wembury point, the eastern boundary of the Sound, from which it is distant nearly half a mile, though separated merely by a narrow channel. The Rame Head forms the extremity of the promontory which constitutes the western boundary of the sound; it is very lofty, and, when viewed from the southward, assumes a form completely conical. There is a small white building (ruined chapel) on the summit of the Head, which, together with the turreted beacon-tower on Penlee heights, the steeple of Rame church, Maker tower, Mount Batten, the large white limestone forts at Staddon point and Mount Edgecumbe park, and the Mewstone, cannot fail of well identifying the land in this neighbourhood.

HARBOURS. — Plymouth is generally considered, and not without great reason, as the most capacious and secure rendezvous in Great Britain. It possesses two good harbours, Hamoaze and Catwater. Hamoaze lies at the entrance of the river Tamer, and, though the ingress is somewhat contracted and circuitous, it is by far the most considerable of the two, inasmuch as it is the principal resort of Her Majesty's ships, and contains space sufficient for a hundred sail of the line at moorings, independent of anchorage for smaller vessels in moderate depth of water, and on good holding-ground, and most effectually secured against every possible contingency in respect to wind and sea. Catwater forms the entrance to the river Plym, and, with Sutton pool, is frequented principally by merchant-vessels and foreigners. In Mill bay there is a wet and dry dock, tidal basin, seven building-yards, and three patent slips. The wet dock is 1,260 feet long, 450 feet broad, with 80 feet width of entrance, and 31 feet over sill at high water springs, and 27 at neaps; the dry dock is 367 feet long, 92 feet broad, with 80 feet width of entrance, 27½ feet over sill at springs, and 23½ at neaps, and the tidal basin has an area of 30 acres with from 14 to 80 feet in it at springs and 10 to 76 feet at neaps. There is also a dry dock at Sutton pool and one at Turnchapel; the former is 265 long, 54 broad, with 50 feet width of entrance, 16 feet over sills at springs and 11 feet at neaps; the latter is 190 feet long, 57 broad, with 45 feet width of entrance, 14 feet over sill at springs and 10 feet at neaps. A fixed light (Gas) is exhibited on the West Barbican pier-head, 29 feet above high water, and may be seen at the distance of 6 miles.

BREAKWATER.—A magnificent Breakwater has of late years been thrown across the Sound for the protection of the anchorage; its western extremity is placed about 210 fathoms to the northward of the shoal of the Panther; and extending towards Bovisand Bay, directly across the shoal of the Shovel, terminates in the vicinity of Staddon point, from which it is distant 360 fathoms. The central division of this Breakwater makes an angle with the true meridian of N. 86° W., and is in length 3,000 feet, from each end of which an arm or head projects to the distance of 1,050 feet more, so as to shut in that part of the Sound which lies to the south-eastward of a straight line drawn from Penlee to Dunstone points. On its eastern end is a conical Beacon, bearing a mast with a ball on its summit.

The LIGHTHOUSE is erected on the western end of the Breakwater, and the light, which was first exhibited in June 1844, is Red to seaward, but changes to Bright as soon as it bears S.W. ½ W., and everywhere over the anchorage ground within the Breakwater; and no vessel should anchor till she has passed inside of that bearing. The lantern is 63 feet above high water. A large bell is tolled in foggy weather. On 1st June 1854, an additional Bright light was established

in the tower, 15 feet below the above Red light, to serve as a *leading* light to guide vessels more effectually by night in entering the Sound by the Western channel. It will become visible immediately upon passing the Chequered buoy of the Draystone from the westward, and the Black buoy of the Knap from the eastward, and is so placed that it can be seen only by a vessel when she is between the lines of bearing of the upper light, from each of the two above-mentioned buoys; and therefore, when visible, the channel is open, and she may run direct for it, taking care to give it a berth of about a cable's length in rounding the breakwater.

DANGERS without the BREAKWATER. — The dangers when approaching Plymouth Sound without the Breakwater are, on the western side, the Draystone; in the centre, the Knap, Panther, Tinker, and Shovel; and on the eastern side, the reef off the Mewstone and the Shagstone, with the rocks in its vicinity.

DRAYSTONE.—At the extremity of the Draystone, or reef which projects nearly a quarter of a mile in a south-easterly direction from Penlee point, a Chequered Red and White buoy is moored in 5 fathoms with the following marks:—Tor House in a line with high water mark at Redding point, and the Breakwater beacon on with the upper and S.E. corner of a stone quarry at Staddon point.

The SHAGSTONE, though small, is a remarkable rock, being very nearly square; it is always above water, and lies in a north-westerly direction nine-tenths of a mile from the Mewstone.

The KNAP and the PANTHER constitute very nearly one continued shoal of sand and rock, which trends in a north-easterly direction, and is 3½ cables in length; the least water over the former is 18 feet, nor is there less over the latter. Each end of this shoal is distinguished by a Black buoy. The buoy of the Panther (the north end of the shoal) lies in 5 fathoms water, with the following marks:—the spire of St. Aubyn chapel nearly touching Ravenness point, and the Hummock on Gurnose point in one with the inner part of the Reny rocks. The buoy of the Knap lies in 6 fathoms water, with the Gamekeeper's cottage, in the valley at the termination of Mount Edgecumbe park, in one with the Officer's house at the signal-station on Maker heights; and the Block-house on Devil's point just open to the eastward of Ravenness point.

The SHOVEL is a more extensive shoal than either of the others, being one quarter of a mile in breadth from north to south, and one-third of a mile in length from east to west, with rocky patches of 13, 15, 16, and 24 feet on different parts of it. The eastern half of the Breakwater is laid down directly over the middle of this shoal, so that the buoyage has been discontinued.

The TINKER is the outer and most south-eastern shoal, and lies three quarters of a mile from the centre of the Breakwater. It is a quarter of a mile in length from east to west, one eighth of a mile in breadth, and has from 10 to 14 feet water upon it. There is a White buoy on each end of this shoal; the western buoy lies with the Dock-yard chapel just in sight to the eastward of Ravenness point, and Wembury point just in sight to the northward of the Shagstone. The space between the Tinker and Breakwater is almost completely occupied by ledges of rocky ground, over and among which there are from 3 to 5 fathoms water.

The SHAGSTONE lies on the extremity of that extensive rocky ledge which projects in a westerly and north-westerly direction from Andern and Wembury points, and is nearly half a mile to the eastward of the Tinker. This ledge is continuous in a southerly direction, from the Shagstone to the Mewstone, and from the Shagstone it trends also in a northerly and north-easterly direction, into and round Bovisand bay.

The DANGERS within the BREAKWATER, when seeking an anchorage, are, the Duke rock and Leek bed on the eastern side of the Sound, and the shoals called the Scottish Grounds on the western side, and under Redding point.

The DUKE ROCK and LEEK BED form nearly one continued shoal, in the form of a crescent, the convex part being to the westward, near the outer or western edge of which a White buoy is placed in 5 fathoms water. This buoy lies one third of a mile N.N.E. ¼ E. from the eastern end of the Breakwater, in the

following line: The Old White sugar house, or mill,* standing to the north-eastward of Plymouth, four times its own apparent breadth, open to the westward of the castellated building on Mount Batten. There are not less than 16 feet on either of these two shoals, and there are 4 and 5 fathoms both within and without them.

The SCOTTISH GROUNDS are unconnected patches of rock, with from 3 to 4 fathoms water upon them; on their south-eastern extremity a Red buoy is placed in 5 fathoms water. The long northern mark for this buoy is Stoke block-house, Devil's point, and Ravenness point, very nearly touching; and Tor House,† nearly midway between Redding point and the Barrack chimneys on the west end of Drake island. There are several other rocky patches in Plymouth Sound, but they all lie away from the anchorage, with the exception of the New Ground, and that has lately been reduced by the diving-bell to 23 feet on its shoalest part, near which there is a Red buoy.

DRAKE ISLAND BRIDGE is a long reef of rocks which extends from that island to Redding point under Mount Edgecumbe; the deepest channel over it at low water is in 6 feet, and is indicated by two Beacon-buoys, which have been placed there to show the straight channel and best water in which a vessel can take it. The inner one is White and the outer one Red, and vessels may pass them equally well on either side, but very closely, for the channel at low water is but 80 yards wide and 6 feet only in depth. At high water there are from 22 feet to 24 feet, and at half-tide 15 feet: and as in blowing weather, especially with an ebb tide, the sea breaks heavily across the whole channel, no boat or small craft should attempt it after half ebb. Should those Beacon-buoys be knocked away by any accident, bring the opening between the Block-house and the battery on Devil's point in one with the tower of St. John's chapel in Devonport. The cross mark for the shoalest spot on the bridge is, the south-eastern extreme of the rampart on Drake island in one with the southernmost and highest house in Plymouth citadel.

ANCHORAGE.—The limits for the best anchorage in the Sound are comprised within the triangle formed by the following intersections: Penlee point in one with the west end of the Breakwater, Cawsand town in one with the western end of the Breakwater, and the old white Sugar-house, or Round tower, in one with the western side of Mount Batten; in the southern part of this space there are 36 feet, in the centre 30 feet, and in the north-eastern part 26 feet at low-water perigeon or great spring-tides. By regulations established by the Admiralty, Her Majesty's ships are required to occupy the anchorage ground near the Breakwater; and merchant ships are to anchor in the north-east part of the Sound, where the water is more shallow, and where small vessels are more conveniently and safely placed.

WESTERN CHANNEL.—There are two entrances into Plymouth Sound, one between the buoy of the Scottish Grounds and the western end of the Breakwater, and the other between the eastern end of the Breakwater and Staddon point. The former is nearly half a mile in breadth; but the latter is narrowed in some places, at low-water spring tides, to the breadth of 100 fathoms.

The western channel into Plymouth Sound has now become the principal, and is indeed the only entrance that can with safety be used by large ships at all times of tide. Vessels coming from the westward, after passing Rame Head and rounding the Draystone, should keep Bovisand pier head open to the southward of the Breakwater beacon, till the Breakwater lighthouse comes in one with the tower of Mount Batten, bearing about N.E. b. E. ¾ E.; the latter mark clears the Draystone to the eastward. The spire of Plymouth new church‡ should now be brought in one with the Obelisk on the Hoe

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* Usually called the Round Tower.

† Tor House is very remarkable. It stands about 1½ miles to the northward of Plymouth, is white-washed, and consequently greatly contrasted by the dark trees with which it is nearly surrounded.

‡ The new church has a tall spire. The tower of the old church is square, with four pediments.

bearing N.E. ½ E.; steer up with this mark, and having passed the Breakwater, haul to the N.E. for the anchorage in about 5 fathoms.

CAWSAND BAY.—The conical beacon on the eastern end of the Breakwater when brought in one with Bovisand pier-head, bearing E. ¾ N., leads clear of the Draystone off Penlee point in 8 fathoms water, and when that patch of foul ground has been passed, if a vessel is beating through Cawsand bay, either into or out of the Sound, be cautious, if standing to the eastward, not to shut in Tor house with the Barrack chimneys on the west end of Drake island, nor to bring the old white Sugar-house in sight to the south-eastward of the Citadel, which precautions will keep her one third of a cable's length to the westward of the Knap; and when standing to the westward, in the vicinity of Penlee point, should the buoy on the extremity of the Draystone be adrift, do not bring Tor house nearer to Redding point than four times its own apparent breadth; this will keep her to the eastward of the Draystone, over which at low water there is not more than 6 feet.

Cawsand bay be ranged by the lead alone, and in the centre of it very good anchorage may be obtained, with off-shore winds, in from 4 to 6 fathoms water, bearing in mind for this purpose not to open the Bolt Head to the eastward of the Mewstone, nor to shut in the west end of Drake island with Redding point. The ground in the northern part of the bay is foul and rocky for a very considerable distance off, as it is also off Penlee point and the Fish-house.

The EASTERN CHANNEL into Plymouth Sound should not be attempted by vessels of any considerable draught of water, unless with a free wind because of the numerous rocks which are scattered in its vicinity, and the occasional send or depression of the sea there, with south-westerly and south-easterly winds. The mark for this Channel is, to bring the Beacon on the eastern end of the Breakwater in one with the Beacon on the Hoe bearing N. b. E. ¾ E. easterly, which will lead between the Tinker and the Shagstone, and nearly up to the Breakwater in 6, 4, and 5 fathoms water.

In the centre of the fair-way, however, are three rocky patches of 24 and 18 feet water, at low springs, the eastern extremities of which rather encroach upon this line of direction; two of these lie nearly half a mile to the southward of the Breakwater, the third about one cable's length; all three are marked by Black and White Chequered buoys; the Tinker by White buoys; and the Shoal bank (which extends from the eastern shore and the Shagstone) by two Red buoys. The above mark will lead in between these buoys, and is to be continued till Maker tower comes in one with the signal-staff on the Breakwater; then steer towards Staddon-point, so as to bring the spire of Plymouth new church exactly in a line with the centre of Tor house, which will clear the latter shoal alluded to (the one of 18 feet). The Breakwater may be rounded for the anchorage at the distance of 60 or 80 fathoms, leaving the Leek bed and Duke rock to the northward. At night the light on the west Barbican pier-head, open of Mount Batten, bearing N.N.E. ½ E., leads through. There is no anchorage in this channel.

CAUTION.—When running into or out of the Sound in the day-time upon any of the before-mentioned leading marks, bear in mind that, so long as the Bolt Head continues in sight to the southward of the Mewstone, you are without or to the southward of all the shoals, and that the Bolt Head, shut in with the Mewstone, ranges very closely upon the tails of both the Tinker and Knap. When entering the Sound from the eastward, the Mewstone should not be approached nearer than half a mile till the Breakwater beacon is brought on the Shagstone bearing about N. ½ E., as that line of bearing clears all the sunken rocks to the westward of the Mewstone, and passes them in 11 fathoms. There is a good channel between the Panther and the Breakwater, having from 6 to 7 fathoms water, and one also to the eastward, between the Breakwater and the southern rocks, either of which may be adopted in cases of emergency. In the latter channel, however, the Shovel and Breakwater must be ranged within the distance of half a cable where there is a depth of 4½ and 5 fathoms.

ENTERING AT NIGHT.—Coming from the south-westward, and intending

to run into the Sound during the night, bring the Eddystone light to bear S.W., and keeping it in that direction, steer boldly in, N.E. b. E., or N.E. b. N. by compass, according to the set of the tide, until the water shoals to 20 fathoms, in which depth Penlee point will be distant about 1¾ miles. In this position the Breakwater light will be seen nearly a-head, if the bearings from the Eddystone have been preserved. Do not approach Penlee point nearer than 9 fathoms water when rounding it, as there is only that depth at 2 cables' length from the Draystone; and having made the Breakwater light, bring it on a N.E. b. E. ½ E. bearing, and run for it until the low light in the lighthouse is seen, when the channel will be open, and you may run direct for it. After rounding the Breakwater at any convenient distance, haul to the north-eastward, but do not anchor till the light is quite bright.

TIDES.—At Devonport dock-yard it is high water, full and change, at $5^h\ 43^m$; rise at springs 17 feet 9 inches, at neaps 14 feet 3 inches. The rise and fall of the tide depends much on the strength and direction of the wind; S.S.W. winds make the highest floods and lowest ebbs: northerly winds a contrary effect.

The tides about Plymouth Sound are pretty regular, both flood and ebb, generally running each way about six hours and ten minutes at a mean. In Hamoaze the flood stream continues to run up, on spring tides, about 15 minutes after high water at the dockyard.

It is high water in Catwater a quarter of an hour earlier than at the dockyard; but with strong winds from the southward and westward the tide flows half an hour longer in both harbours.

At the Breakwater it is high water about half an hour earlier than at the dockyard, but the stream drains in about ten minutes after the water has ceased to rise.

The EDDYSTONE lighthouse, which stands upon a rock called the Eddystone, bears E. ¼ S., 38¾ miles from the Lizard; S.W. ¼ S. 8½ miles from Penlee point; and W.N.W. ¼ W., 18 miles from Bolt Head. The south-eastern and north-eastern sides of the Eddystone are foul nearly half a mile off from the main rock, but the north-western, western, and south-western sides are perfectly clean within a quarter of a mile, or even less. The lantern is 72 feet above high water, and shows a Fixed Bright Light, visible in clear weather at 13 miles.

The HAND-DEEPS lie N.W. ¾ N. 3⅓ miles from the Eddystone, with only 22 feet of water on them; they are composed of perfect rocky pinnacles, and are very dangerous for large ships in a long swell, and therefore should be studiously avoided, as these pointed rocks would pierce their bottoms in an instant. The marks for their centre are, Mount Batten round tower in a line with Penlee point, and the eastern visible part of the Moor hills on with the sharp top of the Mewstone. The Breakwater lighthouse in one with Penlee point, E. b. N., leads a long mile to the north-westward of them; and a mile to the south eastward of them when in one with Mount Batten round tower, bearing N.E. b. E. ¾ E. In bad weather the position of the shoal may be discovered by the short turbulent breaking sea in its vicinity, and in fine serene weather, by the rippling and noise which the tide makes over it.

SECTION VIII.

FROM PLYMOUTH TO THE LAND'S END AND SCILLY ISLANDS, INCLUSIVE.

VARIATION 23½° WEST.

RAME HEAD forms the extremity of the promontory which constitutes the western boundary of Plymouth Sound; it is very lofty, and, when viewed from the south, appears completely conical.

From Rame Head the distance to Deadman Point is 23 miles, the course W. b. N. To St. Anthony's Head the entrance to Falmouth Harbour 32 miles W. ¾ N., and to the Lizard 43 miles W. ¼ S.

LOOE.—The roadsteads off Looe harbour afford good shelter from westerly winds, and are only open from S. b. W. to S.E. b. E. The outer roadstead is from a third to three quarters of a mile to the eastward of Looe island, and will contain about fifteen sail, drawing from 12 to 18 feet water. The anchorage is in from 4 to 8 fathoms, over an oazy bottom perfectly clear of rocks, with the summit of the island from W. to S.W. b. W., and the tower of East Looe church well open of the land forming the western entrance to the harbour, bearing N. b. W. The best anchorage in the inner roadstead, where about ten vessels drawing from 9 to 13 feet water may lie with safety in from 3¼ to 5 fathoms over a sandy bottom, is with the Hedge next northward of Ore Stone point kept open of Hannafore point W. b. S. ¼ S., and East Looe church tower N.N.W. ½ W.

DIRECTIONS.—In approaching the Roads from the westward, keep the trees at Killagarth open of the high land at Talland, until Looe church tower comes well open to the eastward of the land forming the western entrance to the harbour, bearing N. b. W. to avoid the dangerous patches called the Rennies rocks, which run off a good third of a mile in a S.E. b. S. direction from the S.E. end of Looe island. It dries from the island to the main at very low springs, but at most other times there is a passage for boats and small coasting vessels. The marks to lead through are, the Dodman just in sight to the southward of the Ore stone bearing west northerly, until the summit of the island bears S.E.: then haul out S.W. b. S. to clear the Kimlers, which are two reefs that dry at low springs. It It is high water, full and change, at the entrance of Looe harbour at $5^h\ 28^m$; rise at springs, 16 feet 9 inches; at neaps, 13 feet 6 inches.

FOWEY HARBOUR lies about E.N.E. 9 miles from the Dodman, and the entrance, which is a little more than a cable wide, may be easily distinguished by the high land on either side, and more particularly by the ruins of St. Saviour's church on the eastern side, and the old mill on the high ground forming the western side.

The ingress and egress of this harbour being in a N.E. b. E. and S.W. b. W. direction, gives it an advantage over many along the coast, as outward bound vessels can leave it with a S. b. E. wind, and coasters, whether bound up or down channel, that get embayed between the Dodman and the Rame head during a heavy southerly gale may run for it even with the loss of anchors; for having passed the eastern point of the entrance and rounded Polruan point, they may safely run on the bar, which has from 3 to 5 feet on it at low water springs, and being composed of soft mud, no harm can ensue, from which position the flowing tide will release them, when they can run as high up the harbour as convenient. There is space sufficient for four vessels of 16 feet draught of water to moor in Polruan pool, which lies a quarter of a mile within the entrance; and although it appears on the chart to be exposed to south-west gales, it is not so, there being

no swell between the entrance points. Thirty vessels of 18 feet draught may also lie moored above the bar perfectly land-locked.

DIRECTIONS.—In approaching the harbour from the westward, keep Gwineas rock on a W.S.W. ½ W. bearing, and well open to the northward of the Dodman, and be sure not to bring the rock in one with the Dodman until within a quarter of a mile of the entrance, for in that line of direction lies the Canness rock which covers at half tide; when in the entrance the rock will be in one with the Dodman.

In approaching from the eastward, steer parallel with the shore, at about the distance of two miles, until the Dodman bears about W.S.W. ½ W., or until the church and mill are clearly distinguished, when steer boldly in for the anchorage, there being no danger off either point or shore but what is visible. A pilot may be obtained if required. In the roadstead, without the harbour, there is good anchorage in from 5 to 10 fathoms, but without that depth the ground is foul.

TIDES.—High water, full and change, at Fowey at $5^h\ 25^m$; springs rise 15 feet, neaps 7 or 8 feet.

FALMOUTH HARBOUR.—The entrance to Falmouth harbour may be easily known by day by St. Anthony Head or hill on its eastern side, on the point of which stands the Lighthouse, and by the castle of Pendennis on its western side; the former elevated 204 feet, and the latter 233 feet above high water.

The light exhibited on St. Anthony point is elevated 72 feet above the level of high water springs, and is visible on all bearings from N.W. ½ N round seaward, and up the harbour, appearing in a quick regular succession of Brilliant Flashes, of 20 seconds duration, which may be seen 12 miles off.

A dangerous rock named the Lugo bears S.S.W., distant nearly a sixth of a mile from St. Mawes castle. A black buoy, to be left on the starboard hand in entering, is moored about a quarter of a cable's length to the southward of the rock, with Mawnan church in one with the beacon on the Black rock which lies nearly in the centre of the entrance.

A vessel being embayed during a southerly gale between the Manacles and St. Anthony point, and seeking refuge at night in Falmouth harbour, should steer for St. Anthony light on a N.N.E. bearing, and pass between 2 or 3 cables' lengths to the westward of St. Anthony point; from thence the course into Carrick road will be N. ¼ E. easterly, distant 1½ miles.

When moored in Carrick road the hawse must be kept open, as southerly winds throw in much sea. Cross road and St. Just pool, though inconveniently far from Falmouth, afford better shelter and anchorage.

EASTERN CHANNEL.—The best channel, which is nearly half a mile in breadth, is to the eastward of the Black rock (which covers at 8 feet water), on which there is a beacon consisting of a cone bearing a mast with a Ball on its summit; care being taken to give the rocks off St. Anthony point a good berth, and not to approach the Black rock nearer than 1½ cables' lengths. Within the Black rock, towards the spit of Falmouth bank, there are some spots of foul ground with only 20 feet on them at low water springs.

DIRECTIONS.—A vessel from the westward bound to Falmouth by night should keep the Lizard lights in sight to the southward of the Beast until St. Anthony light bears N.N.E., to clear the Manacles.

In the day time the Beast should be kept open of Black Head; and when St. Anthony lighthouse bears N.N.E., keep it on that bearing till Killigannoon house is in one with Penarrow or Mylor point, bearing N. ¼ E. easterly, which will lead in through the eastern channel, and through the narrows between the White buoy on Falmouth bank, and the Black buoy on St. Mawes' bank, into Carrick road, where a vessel may anchor in from 12 to 18 fathoms, or proceed on until Budoc church comes over the rising ground of Trefusis point, or the Summer house is in one with Falmouth church bearing W. b. S., which will lead through the Cross road, till St. Keverne church comes over Pendennis point, bearing S.W.; with which mark she may anchor in St. Just pool in from 12 to 15 fathoms, over a muddy bottom.

In hazy weather a vessel should give St. Anthony Point a berth of 2 or 3 cables'

lengths, and run in with the land of St Mawes about a point on the starboard bow, and then steer for Penarrow point. She should not approach the land of St. Mawes nearer than 2 cables' lengths, nor St. Mawes bank within 9 or 8 fathoms. With the wind at east she will sail in free on the starboard tack, and at W.N.W. on the port tack.

WESTERN CHANNEL.—Vessels not drawing more than 18 feet may safely pass between the Black rock and Pendennis point, and at half tide there is water for ships of the line. By taking the centre of the channel, and steering a N. b. E. course, it will lead up between the Black and White buoys in the narrows; or when the Black rock beacon and lighthouse are in one, steer for St. Mawes castle until Killigannoon house comes on with Penarrow point, bearing N. ¼ E.. and proceed as before. In this channel a vessel will sail in free on the port tack, with the wind at N.W. b. W.; and although the high land of Pendennis may cause it to baffle, there is no danger to be apprehended when she has shot within the Black rock.

OUTER ROAD.—Outside the entrance of Falmouth harbour lies the Outer road; but no vessel should anchor farther to the eastward than to bring St. Mawes quay in a line with Carricknath point; nor farther to the westward than Mesack point in one with the Black rock perch; or not farther off than will just open the Penare Head of Killygerran Head bearing E.N.E.; or Budoc church in line with the middle of Swan pool sandy bay, bearing N.W. b. N. ¼ N. By any position taken within the space thus marked out, she may, on the wind getting to the eastward, and rendering it an unsafe anchorage, either proceed to sea with ease, or run into the harbour; the entrance into which is by these means kept open.

OLD WALL ROCK.—The marks for the Old Wall or Pinnacle rock, which lies to the eastward of this anchorage, and 1¼ miles due south of St. Anthony point, are, Restronguet smelting-house chimney in one with the eastern extreme of the broken rocks off St. Anthony point bearing N. ¼ W.; and the Greeb point showing eastward of Killygerran Head, bearing N.E. ½ E. This pinnacle has only 27 feet water on it, but there are 5¾ fathoms round it, and within are a number of rocky patches of 4 fathoms of broken, uneven ground, extending nearly to the shore, and causing a good deal of overfall, especially with S.E. winds and a flood tide.

HELFORD RIVER.—Between Nare point and Rosemullion Head, which bear from each other N. b. E. ½ E., and S. b. W. ½ W. 1½ miles, and W.S.W. ¼ W., distant 4 miles from St. Anthony point, lies the entrance to Helford river.

A cluster of rocks called the Gedges lie a quarter of a mile from the shore on the northern side of the entrance, and are cleared to the southward by keeping Bosahan point open of Mawnan Chair point, bearing W. b. N. ¼ N.; and to the eastward by keeping the Pilot's look-out house at Falmouth open of Pennance cliff, N.N.E., ¾ E.

DIRECTIONS.—A vessel in entering Helford river will be to the westward of the Gedges when the Carn Du or Manacle rock is in one with the high water mark on Nare point bearing S. ¼ W. and should give the shore on either side of the river a berth of a good half cable's length. After passing Dourgan, the white house of Calamansack just touching the northern point of Porth Navas, N. W. b. W. ½ W., will lead up to the anchorage in 4 fathoms, over a mud bottom, the Old Ferry house bearing N. ¾ E.

GILLINS CREEK.—The entrance to Gillins creek lies close to the southward of the entrance to Helford river. A rock, which dries a foot at low water springs lies near the middle of the entrance, which is only 1½ cables in breadth. The Thatched house on the southern shore near Flushing, open, bearing W. ¼ S. clears it on the northern side, and the same house shut in leads to the southward; within Erra point there are only 2 feet at low water springs.

SWANPOOL.—From Rosemullion Head to Pennance point the cliffs vary from 20 to 50 feet in height, and half way between the points lies a deep sandy cove celled Maenporth. From Pennance point to Pendennis point the coast is very irregular, the cliffs continuing about the same height, and the low water rocks, which are shelving, extend nearly a cable's length from the shore. Within the

bight to the northward of Pennance, is a deep inlet, with a space of retained water called Swanpool.

NARE POINT.—From Polkerris point to Nare point, the land slopes abruptly to the cliffs, and at about a mile to the southward of Nare point is Porthalla bight, which is exposed to the eastward. The low water rocks extend upwards of a cable's length off the head of this bight; and from thence to Nare Head are masses of detached rocks, which lie two thirds of a cable's length from the shore. To clear the south-eastern side of the low water rocks which extend E. ½ S. a cable's length from Nare point, keep St. Keverne church well open of Nare Head, bearing S.W. ¼ S.; and to clear their northern side, keep the houses in Flushing (which stands on the southern shore of Gillins creek) open of Erra point, bearing W. b. S.

The MANACLES are a group of dangerous rocks connected by ledges, lying about 3 miles to the E.N.E. of Black Head, and S.E. ½ S. a good three quarters of a mile from Manacle point. They all cover at high water springs except the Carn Du, which is the south-westernmost rock and uncovers 5 feet; from it the Maentenoweth rock, which covers at a third flood, bears N. b. E. ¼ E. two thirds of a mile, which is their greatest breadth.

The Penwin and Vase rocks bear from each other N.N.E. and S.S.W. half a cable's length apart, with 6 fathoms water between them. The former or outer rock lies awash at low water (at which period there are only 4 feet on the Vase), and bears E. b. N. about half a mile from the Carn Du; the marks for it are, the Little Wrea showing between the Carn Du and the Inner Maen Vose bearing W. b. S. ¼ S.; and Mawnan church in one with the high water mark on Nare point, bearing N. ¾ E. A Black Buoy, with the word "Manacles" on its head, is moored about 50 fathoms to the south-eastward of this rock, in about 20 fathoms water with Mawnan church tower touching the first rise of Nare point, N. ¾ W.; St. Anthony lighthouse. N.E. b. N.; Black Head, W.S.W.; and St. Keverne church spire, N.W. b. W. ¼ W. The marks for the Vase are, the extreme of Black Head in one with the Inner Maen Vose, bearing W. b. S. ½ S.; and St. Keverne church spire in line with the Wingoes rock N.W. b. W. ½ W.

DIRECTIONS.—Coverack Coast Guard watch-house open to the southward of the Wrea rocks, bearing W. ¾ S., will clear the Manacles at half a cable's length to the southward; but a vessel in proceeding towards them from the Lizard should keep the Beast point open of Black Head, bearing W. b. S., until the square tower of Mawnan church appears well open to the north-eastward of the lowest point of land at the Nare point, bearing N. ¾ W. westerly. She will also be to the northward of all the rocks when the houses on the southern side of Porthoustoc cove come open, bearing W.N.W. ½ W. At night keep the Lizard lights in sight to the southward of the Beast, until St. Anthony light bears N.N.E.

The INNER PASSAGE lies between the Maentenoweth and the outermost low water rock of the Verwin, which bear E. b. S. and W. b. N. from each other, and are a little more than a cable's length apart. In taking this channel from the south-westward keep close to the south-eastern extreme of the Carclase, and after passing them, bring the Little Wrea in one with their outer extreme bearing S.W. ¼ S., which will lead in the fairway between the Maentenoweth and the low water rocks to the south-east of the Verwin; and when the houses on the southern side of Porthoustoc cove open out, the dangers will be cleared to the north-eastward.

In approaching this passage from the north-eastward, bring the Little Wrea in one with the south-east extreme of the Carclase, bearing S.W. ¼ S., and on nearing the latter give them a berth of about a quarter of a cable's length.

MANACLE POINT.—The cliffs from Lowland point to Manacle point vary from 20 to 50 feet in height, the shore being composed of large boulders to the north side of the bight, but from thence it is studded with high detached rocks. From the latter point to Polkerris point the cliffs are about 60 feet in height.

Off Manacle point lie the Carclase rocks, the highest being elevated about 22 feet above high water. Their outer extreme is a good cable's length from the shore, and at about the same distance to the S. b. W. ¼ W. of the high Carclase

is a rock which covers at a third flood. The Verwin are two detached rocks; the highest covers only with extreme high water springs, and bears N.N.E. ¼ E. a cable's length from the Carclase. Their northern side is nearly connected with a rocky ledge; and off the higher Verwin are three rocks covering at a quarter flood, the centre rock bearing W.S.W. distant half a cable's length.

PORTHOUSTOC COVE lies close to the northward of Manacle point, and is open to the eastward; on its northern side are a ledge of rocks extending three quarters of a cable's length from the shore. In a S. ¾ E. and S.S.E. ½ E. direction from Penera Head, the next point to the northward, are two detached low water rocks, at upwards of a cable's length from the shore; and in a S.E. b. E. direction, and at 2 cables from the shore, lies a small shoal with only 2½ fathoms on it.

The MEANLAND ROCK bears from the Little Wrea N.E. b. N. nearly a third of a mile, and covers at a third flood. It has three small rocks at a third of a cable's length to the westward of it, which cover at a quarter flood. Black Head open of Lowland point bearing S.W. b. W. ½ W., clears it to the southward; and in one with Lowland barn to the northward.

LOWLAND POINT.—At about half-way between Coverack pier and Lowland point are a patch of rocks called the Peny maen, extending upwards of a cable's length in a southerly direction from the shore, and covering only at extreme high water springs; rocks continue to range from one to 1½ cables from the shore, until abreast of the Great Wrea, and without these are three outlying rocks called the Dava, the Hoar, and the Little Wrea.

The Dava covers at half flood, and the mark for it is, the Carn du Manacle in one with the Little Wrea, bearing E. b. N. ½ N. The Hoar bears N.E. b. E. ½ E. 1½ cables' lengths from the Dava, and also covers at half flood. The Little Wrea covers at high water, and lies two cables' lengths in a E. b. S. ½ S. direction from Lowland point; and at a third of a cable from it, in the same direction, is a sunken rock with only 10 feet water over it. The Great Wrea is a high detached rock lying nearly a cable's length due south from Lowland point, and has several small rocks at a third of a cable's length to the south westward of it.

COVERACK COVE lies between Chynhals and Lowland points, and affords shelter for coasters from the S. W. (round westerly) to the N.E. The best anchorage is in about 4 fathoms, with the end of the pier, which runs out in a N. W. direction and affords shelter to the Seine boats, bearing W. b. S. ½ S. distant a quarter of a mile.

BLACK HEAD.—A group of high rocks, part of which never cover, extend from the shore about a cable's length due south from Black Head, and at their outer extreme lies a small detached rock which covers at a quarter flood. Between the Head and Chynhals point, the low water rocks the off shore upwards of a cable's length, and also in a southerly direction to a sixth of a mile from that point; to the eastward of the point, and at about a cable's length from the shore, lie a patch of rock called the Guthens, which cover at high water.

From Black Head to Chynhals point, which projects to the eastward, and is elevated 92 feet above high water, the cliffs are about 200 feet in height; but from thence to Lowland point they are only from 10 to 20 feet in height, with a ridge of high land rising abruptly to 300 feet at the back.

BETWEEN the LIZARD AND BLACK HEAD.—From the Lizard to Kennack cove the cliffs vary from 160 to 200 feet in height, and terminate in a low sandy bight, from whence they rise abruptly to 200 feet, and continue so to Black Head, which is 218 feet above high water. Between the Lizard and Black Head are several bights and coves, called Housel bay, Perran Vose, Cadgwith, and the Beagle, which are occasionally frequented by coasters in strong northerly winds.

Between Cadgwith and Kennack coves the shore must not be approached within two cables' lengths, as it is bordered with outlying rocks which cover at from a quarter to three quarters flood. A small rock, called the Bo, lies in the entrance to Cadgwith, and covers at a quarter flood. A mass of rocks extends

1¼ cables' lengths in a southerly direction from the Kennack sands, called the Caerverrack, the outer part of them covering at half flood. At about half a mile distant from the Karak clews rocks, in a line between it and the Caerverrack, and nearly a sixth of a mile from the shore, is the Jay rock, which covers at two thirds flood. From the Karak clews to Black Head the chief outlying rocks extend in a southerly direction two thirds of a cable's length from Pedn Boar point, and cover at a quarter flood.

The LIZARD is a bold and precipitous promontory, and may be approached with great confidence as well in the night as during the day, if the weather be at all clear. The only dangers to be apprehended in its vicinity are the Stags.

The Lighthouses on the Lizard stand high, and are well placed as leading marks for avoiding both the Wolf and the Manacles; it is, however, to be regretted that they do not stand farther apart, as, at night, the brilliancy of the lights, which are Fixed, prevents their being distinctly defined when opening out or shutting in. Their line of bearing is W. ¾ N., and E. ¾ S., distant 223 feet, and the eastern light 229 feet, and the western light 232 feet above high water; when in one, they clear the Manacles to the eastward, and the Wolf to the westward.

The STAGS.—The rocks off the Lizard, commonly called the Stags, are the Mulvin, the Man-of-War, the Carligga, and the Maenheere, to the south-westward and southward; and within the latter to the northward lie the Crenval and Ennach. They extend to nearly half a mile from the coast, and have from 5 to 9 fathoms close to and among them; and within them are masses of detached rocks nearly joining the shore.

The Mulvin covers at high water springs, and bears W. b. N. northerly from the Lizard, distant two thirds of a mile. The Man-of-War rocks bear W. ½ N. nearly the same distance from the Lizard, and S. E. 1½ cables' lengths from the Mulvin. The Carligga bears S.W. b. W. ½ W., and the Maenheere S.W. ¼ S., nearly half a mile respectively from the Lizard, and N.E. and S.W., distant 1½ cables from each other; they cover at three quarters flood, and within them are patches of detached rocks nearly joining the shore. The Ennach, which lies nearly 1½ cables to the north-eastward of the Maenheere, covers at half flood.

The marks to avoid them on their eastern side are, the Ynys Head or the beach at Kennack cove kept in sight to the eastward of Beast point,* bearing about N.E.; and Godolphin hill kept open to the westward of Pedncrifton point, or Pradanack point open of Rill Head N. ¼ W., will clear them to the westward nearly a third of a mile.

VROGUE ROCK.—A dangerous sunken rock with only 6 feet over it, called the Vrogue, lies S.E. upwards of a third of a mile from Beast point. The marks for it are, the Balk in one with the middle hummock of Hot point, bearing N. b. W. ¼ W.; and Ruan Minor church tower in line with the western ridge at the entrance to Cadgwith, N. b. E. ½ E.

The SPERNAN outermost shoal bears from the Lizard lights E. b. S. ¼ S. distant 1½ miles, and from Hot point S.E. ¼ E. two thirds of a mile. The marks for it are, the top of the western lighthouse just showing to the southward of the eastern one bearing W. b. N. ¼ N.; and Treleague house in one with the western face of Cadgwith cliff, N. ¼ E.; it has 5 fathoms on its shoalest part, and between it and the shore are several rocky patches carrying the same depth.

The CRAGGAN ROCK has only 5 feet over it at lower water springs, and bears from the Beast point N.E. b. E. nearly a mile, and S. ½ W. nearly two thirds of a mile from Cadgwith cove. The marks for it are, Landewednack church west a little southerly; and Treleague house in line with the western face of the entrance to Cadgwith. A small rock lies off Perran Vose cove named the Va, which covers at 3 feet flood, and bears S.E. ¾ E. from the extreme of the Balk, distant nearly 2 cables' lengths.

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* This promontory forms the eastern part of the land at the Lizard, and being considerably higher than the Lizard lighthouses, excludes the view of the lights from those vessels which approach nearer to Black Head than the distance of 1½ miles.

To avoid all the shoal water off the Lizard, keep Godolphin hill open of Rill point, bearing N. ¼ W., until Lowland barn comes open of Black Head, bearing N.E. b. E.

RIPPLINGS.—South of the Stag rocks there is always an extensive rippling on both streams of tide, stretching as far seaward from the rocks as 2 or 3 miles; but this is chiefly occasioned by the unevenness of the ground, and when it blows strong from seaward during the spring tides the sea is very short and violent.

There is another extensive race or rippling to the south-east of the Lizard, but occasioned by the confluence of the tides. At two hours' ebb the stream at the Manacles begins to run to the S.W., where meeting with the stream out of the bight between Cadgwith and Black Head, which sets to the eastward from half ebb till 5 hours' flood, they coalesce and both set to the S.E.; but at 2 hours' flood the stream at the Manacles again begins to turn, and this S.E. line of direction is warped more easterly, till at high water it ceases altogether.

The land between the Lizard and the Start is, generally speaking, moderately high, and being for the most part double, exhibits a great variety of elevation to a vessel in the offing as she varies her position. It also contains many deep openings between Helford and Looe, which, at a distance, seem to destroy the connexion. Five miles to the north-east of Falmouth, the lofty conical rock called the Gray serves to render this part of the coast remarkable. Four miles farther, and nearly midway between the Lizard and Rame Head, the Dodman stands out boldly to seaward; it is a precipitous bluff 380 feet above the sea, its steep face being towards the east, and declining gradually to the westward. Gribben Head to the westward of Fowey, and immediately succeeding the deep bight of Polkerris, is distinguished by a beacon tower 85 feet high, standing on an elevation of 257 feet above the sea. From thence to Looe the land continues high and irregular; rather declining towards Whitesand bay, but again elevating itself in the vicinity of Plymouth.

DIRECTIONS.—In proceeding to the eastward from the Lizard during the night, keep the lights in sight to the southward of the Beast. This precaution will lead at least 1½ miles to the southward of Black Head, and direct to the Eddystone. In thick weather come no nearer the Lizard than 47 fathoms, as a vessel will then be only 6 or 7 miles distant from it.

The course from any position off the Start to a corresponding position off the Lizard is about W. ¾ N., and the distance between these two headlands is 21 leagues. When navigating between these headlands do not go into less water than 42 fathoms, by which precaution you will pass at least 5 miles to the southward of the Eddystone, the parallel of which cannot be approached eastward or westward of that rock so long as that depth is preserved. In the stream of the Eddystone there are from 34 to 37 fathoms; the ground in the former depth consists of coarse and of fine sand, but in the latter a sort of dark greenish oazy sand and extends nearly 10 miles in a westerly direction, and 4 miles in a southerly direction, from the Eddystone. The mark for the western extremity of this oazy matter is, the steeple of Rame church appearing open to the westward of the vertex of the Rame Head, and Looe island bearing N.N.E. ¾ E. Endeavour to round the Start point within the distance of 5 or 6 leagues, or in 38 and 39 fathoms; by which means you will avoid the Channel islands' indraught, even during the period when its effects are most to be apprehended, that is, between low water and 5 hours' flood.

TIDES.—At the Lizard it is high water, full and change, at $5^h\ 0^m$, rise at springs 17 feet, at neaps 13 feet 8 inches; at Coverack pier $4^h\ 45^m$, rise at springs 18½ feet, at neaps 14 feet; at the dock yard pier at Mylor Falmouth harbour at $5^h\ 0^m$, rise at springs 18½ feet, at neaps 14 feet; at Looe at $5^h\ 28^m$, rise at springs 16 feet 9 inches, at neaps 13½ feet; at the Eddystone at $5^h\ 25^m$; at Plymouth Sound at $5^h\ 13^m$; and at Salcombe at $5^h\ 50^m$, where springs rise 19½ feet, neaps 11½ feet.

At about 7 miles to the south-west of the Lizard the flood and ebb streams at full and change are nearly of equal duration, and run E. b. S. and W. b. N., the

stream turning 2 hours after high water at Devonport dockyard. Abreast of Plymouth Sound, at about 6 miles in the offing, the streams of tide run in various directions. At $1^h\ 40^m$ before high water at the dockyard, the stream makes to the eastward and continues about E. b. S. until $2^h\ 40^m$ after high water there. During the next hour the stream is scarcely sensible; at the end of which it turns to the southward, gradually changing to W.S.W. till the last quarter of the ebb on the shore, when it veers from W.S.W. to W.N.W. During the first 3 hours flood on the shore, its direction changes from W.N.W. to N.W., when it begins to slacken, and to set about North, till the last 4½ hours flood it again sets E. b. S. as at first.

At about 4 miles to the south-west of the Eddystone, the stream begins to run E. b. S., when it is high water at Devonport dockyard, and continues so about $2^h\ 40^m$, when it begins to slacken and to shift to the southward. At 3½ hours' ebb on the shore it sets W.S.W.; at 4 hours, W. b. N., and then W.N.W. until low water. During the first 2 hours of flood on the shore, the stream sets N.W. b. W., and in the next hour it slackens, setting N.W. and North. During the fourth hour, what little stream there is sets N.N.E. and N.E.; it then sets E.N.E. and E. b. N. till about high water, when it sets E. b. S. as at first.

MOUNT'S BAY.—Mount St. Michael is of a conical form, and rises 262 feet above high water. It is about a mile in circumference, and bears a striking and peculiar resemblance to the fortress and mount of the same name in Normandy, and, together with the little town of Penzance, stands in the north-western part of Mount's bay, which lies between the Runnel Stone and the rocks off the Lizard point, and which bear from each other N.W. ¾ W. and S.E. ¾ E., distant 18½ miles. The inner points of the bay are, the Carn Du to the westward and the Cudden to the eastward, bearing east and west from each other, distant 5½ miles.

TETTERDU POINT.—Before leading the mariner into Mount's bay, we will give a description of the coast and the rocks which border it, beginning at Black rock or Tetterdu point, that slopes gradually to the cliffs, which are not more than 50 feet in height. From this point to the southern side of Lamorna cove, the land rises abruptly, the cliffs varying from 60 to 80 feet in height, and from 80 to 100 feet on the northern side of the Cove to Carn Du point, which rises only 44 feet above high water. At nearly 2 cables' lengths to the eastward of Black rock point, and at about the same distance from the shore, are the Buck rocks, which cover at three quarters flood. The Gull rock, which lies off Carn Du point, is very precipitous, and rises 80 feet above high water; and at half a cable's length to the W.S.W. of it is a small rock called the Haver, which covers at a quarter flood.

CARN DU POINT.—From this point the cliffs decrease in height, varying from 50 to 40 feet, until near Flat point, which is only 20 feet high, when they gradually rise from 60 to 90 feet to Penzer point, which is abrupt. From thence to Mousehole they range from 30 to 40 feet, the high land sloping directly to them.

LELLAND ROCK.—At nearly 2 cables' lengths to the eastward of Carn Du point, and about half that distance to the southward of Flat point, lies a rock called the Lelland, which covers at a quarter flood.

MOUSEHOLE HARBOUR is formed by two piers. The southern pier extends out 440 feet in a N.E. b. E. ½ E. direction, and is 47 feet in breadth; the northern pier is only 18 feet in breadth, and runs ont curving to the southward to the distance of 227 feet, leaving an entrance between the Pier heads of 49 feet. The harbour carries a depth of about 9 feet at high water springs, and 6 feet at neaps, over a bottom composed of gravel on rocky ground, and is sheltered from E.S.E. to S.E. b. S. by St. Clement island.

The southern entrance to the harbour is between St. Clement island and the main, and is about 1½ cables in breadth; but the northern entrance, which is formed also by that island and the main, is both foul and contracted, being only half a cable wide.

LOW LEE ROCK.—From Mousehole to Penlee point the shore is very rugged, consisting of heavy masses of loose rocks; and near the eastern side of the har-

bour's mouth are some detached rocks, extending nearly three quarters of a cable's length from the land. The cliffs, which are only 20 feet in height near Mousehole, increase to 50 and 60 feet near Penlee point, the land rising abruptly to 224 feet, leaving only sufficient space for a roadway; from thence they soon decrease to an average height of 35 feet, the land gradually sloping to them, and this feature continues to Newlyn point, which is about a mile to the northward. At a third of a mile to the eastward of Penlee point lies the Low Lee rock, which has only 4 feet water on it at low water springs. The marks for it are, the extreme cliff at Penzer point in one with the northern Hubble* of St. Clement island, bearing S.W. ¾ W., and the tower of St. Paul's church in line with the southernmost new barn, W. b. N. ½ N. A Red buoy is moored 15 fathoms to the eastward of the rock.

The CARN BASE ROCK lies north nearly a third of a mile from the Low Lee, and about the same distance from the shore, and carries the same depth over it at low springs. The marks for it are, St. Paul's church tower in one with the southern side of the longest hedge, bearing W. ½ S,; and Trithal engine-house on with the eastern chimney of the Coast Guard house, bearing north. Both the Low Lee and Carn Base rocks are small in extent, and steep-to on all sides.

NEWLYN.—A curving pier of 208 feet in length and 14 in breadth runs out in a northerly direction from the village of Newlyn to the distance of 80 feet from the shore. The harbour thus formed is capable of containing from 30 to 40 boats averaging 15 tons burthen, and carries a depth of 8 feet at high water springs, and 5 feet at neaps, over a gravel bottom. The sand dries outside the pier to the distance of 104 feet at low water springs. Between Newlyn and Gwavasslips, which are 250 feet apart, is Gwavas cliff, about 40 feet in height, and in the direction of which is the clearest and safest place to beach a vessel; from thence to Tolcarn bridge, the shore is very flat and stony, and extends off a cable's length from high to low water mark. From Tolcarn bridge to the Coast Guard house, the rocks, which cover at three quarters flood, extend 1½ cables' length off from the shingle beach; and from thence to the Parade wall at Penzance, they extend the same distance from the shore, which is composed of sand.

PENZANCE HARBOUR, which lies in the extreme northern part of Mount's bay, is formed by two piers, and carries a depth of 15 feet at high water springs, and 12 feet at neaps. The northern pier runs in a southerly direction from the inner wall to the distance of 1,715 feet. The southern pier has lately been extended to the eastward, and a new lighthouse erected on its extremity, which shows a Bright Red light at 33 feet above high water for 80° of the circle, or from about a cable's length to the southward of the beacon on the Raymond rock, which bears E. b. S. ¼ S. from the lighthouse, to about the same distance to the eastward of the beacon on the Gear rock, which bears S. b. W. ½ W. westerly from the lighthouse; the remainder of the circle it shows a White light. The light by night and the ball by day will only be exhibited when there are 15 feet water at the pier head, which will be quite 8 hours out of the 12. The harbour contains three building-yards, and a dry dock has been built on its western side 128 feet in length, and 35 in breadth; cranes are also erected on the piers, capable of lifting from 5 to 10 tons. Since the extension of the southern pier there are 23 feet at high water springs, and 20 feet at neaps at the pier end.

GEAR ROCK.—A reef extends a cable's length to the S.S.W. of the southern arm of the south pier of Penzance harbour, called the Battery rocks, and at the same distance without them and in the same direction are some detached rocks, which narrow the channel between them and the Gear rock to a cable in breadth, and which carries a depth of 4 fathoms. The Gear rock lies upwards of 4 cables' lengths to the S. b. W. ½ W. of the lighthouse, and covers at a third flood. The marks for it are, the Catholic chapel in one with the east end of St. Mary's church N. ¼ W., and the middle of Trewarveneth clump of trees bearing W.S.W. ¾ W. An iron pole marks its position.

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* A Cornish word, signifying Hummock or Knoll on the face of the land.

CRESSARS ROCKS.—At the head of the Bay, from Penzance to the bridge at Marazion, the coast is low and flat, and the shore is composed of sand and shingle, which runs off from the high water mark to the Long rock, a distance of nearly 2 cables' lengths. At nearly three quarters of a mile to the eastward of Penzance harbour, and at about a third of a mile from the high water mark on the shore, is the southern extreme of the Cressars rocks, which cover at two-thirds flood. Their western limit, which is only 4 cables' lengths to the eastward of the harbour, is marked by an iron beacon painted Red, and surmounted by a Ball. The Bloon or Raymond rock lies S.E. b. E. ¾ E. a good half mile from the beacon on the Cressars, and at nearly half a mile from the shore, its northern extremity nearly touching the Long rock. It is also marked by an iron Beacon painted Red, and surmounted by a Ball.

HOGUS ROCKS.—The beach to the eastward of the Long rock extends off only a cable's length from the high water mark on the shore, and the coast to Mount St. Michael forms a wide bay, at the eastern extremity of which are the Penzeath and Hogus rocks. The Penzeath is a small patch, lying half a mile to the eastward of the Long rock at 1½ cables' lengths from the shore, and covers at one hour's flood. The Great Hogus is a cluster of rocks lying between Mount St. Michael and the Penzeath, at upwards of a third of a mile from the shore; and the Little Hogus, which covers at three-quarters flood, lies between the Great Hogus and the Penzeath, at about a quarter of a mile from the shore. Venton chimney shaft in one with the end of the western pier of Mount harbour, bearing E. b. S. ¾ S., leads to the southward of the Cressars and Bloon rocks and the shoals without them, in about 3 fathoms at low water.

The HARBOUR of MOUNT ST. MICHAEL, which lies on the northern side of the mount, is formed by two piers, and carries a depth of 11 feet at high water springs, and 7½ feet at neaps. The northern pier, which is 24 feet in breadth, extends out in a N.E. direction for 455 feet, when it abruptly turns to the S.E. ½ E. to the distance of 67 feet. The southern pier runs to the N.N.E. for 232 feet; it then bends to the N.N.W. ¾ W., the whole length being 386 feet from its inner part. The pier-heads bear from each other N.W. ½ W. and S.E. ½ E., and form an entrance 124 feet wide, facing the N.E., where there is a depth of 16 feet at springs and 12½ feet at neaps.

MALTMAN ROCK.—On the eastern side of the Mount, at about 2 cables' lengths from the shore, lie a small cluster of detached rocks awash at low water; they bear from the castle E. b. S. ¼ S. The Maltman rock covers at the first quarter flood, and lies S.W., ¼ S. from the castle, at about a cable's length from the shore.

The GUTHEN ROCK has only 10 feet over it at low water, and lies a good cable's length from the shore; it bears W.N.W. from the castle. Vessels approaching the Mount must be careful to avoid these rocks if bound for the harbour. Acton castle in one with the Hubble of the Greeb rock, bearing S.E. ¾ E., clears the Maltman to the southward; and the Virgin Mine in one with the highest Hubble of the Great Hogus, bearing N.E. ¾ E., leads to the westward of the Guthen.

GREEB ROCK.—Between Mount St. Michael and Greeb rock, which lies a mile to the south-eastward, the coast forms a small bay, with several shoal patches in it, and off its shores, which are low and rugged, the low water rocks extend to three quarters of a cable's length, and at a third of a cable without them, at the several points, lie some detached rocks. The Greeb rock, which rises 24 feet above high water, lies between the Mount and Cuddan point, and is separated from the main by large masses of rock, which extend in a W. b. S. direction from Maendu point. Its outer extreme is nearly a quarter of a mile from the shore, with a detached rock outside of it.

BEARS.—From the Greeb rock, Cuddan point bears S.S.E. ½ E., 1¼ miles, and the coast between forms a bay, in the northern part of which lie a cluster of rocks, called the Bears, which cover at two-thirds flood; the outer rock lies S.E. b. E, 1¼ cables' length from the Hubble of the Greeb. From Maendu point, which is high and rocky, both the cliffs and rocks decrease abruptly to a

low shore, to the southward of which are the Perran sands: from thence to within a sixth of a mile of Cuddan point the shore is flat and rocky. To the north-westward of Cuddan point is a rock standing well out of the water at about 150 feet from the shore; and at a third of a cable's length to the southward of the extreme point lies the Shag rock, which barely covers at high water.

STONES.—The cliffs around Cuddan point are high and precipitous, and to the southward of the point are several shoals. The nearest is a rocky shoal called the Stones, which dries at two different spots at low water springs. From the depth of 2 fathoms on its edges it is about a sixth of a mile in length from north to south, and a cable in breadth. Its western edge bears S. b. E. ½ E. about half a mile from the Shag, and a dry spot on its northern part bears S.E. b. S., a short half mile, where the tower of the castle on the Mount is in one with Shag rock, bearing N.W. b. N. To pass the northward of this shoal, shut the Mount tower in with Cuddan point.

MOUNTAMOPUS.—Another rocky shoal, called the Mountamopus, lies about three quarters of a mile to the southward of Cuddan point, and is 1½ cables in length, and nearly a cable broad. The marks for its shoalest part of 5 feet are, Acton castle in one with the Hubble of Cuddan point, bearing N.E. ¾ N., and Pengersick castle in line with the extreme of Hoe point E. b. N. A Black buoy marks its southern edge.

The CARN MALLOWS is a rocky bank with several patches of 3 fathoms on it, which bear S.E. half a mile from the shoalest water on the Mountamopus. This part lies with Trebarvah farmhouse in one with the extreme of Cuddan point, bearing N. ¾ E. The eastern part of the bank has from 4 to 5 fathoms on it, and lies with Perranuthno church tower in one with the outer saddle of Cuddan point, bearing N. ¾ W. The sea breaks very heavily on the Stones, Mountamopus, and the Carn Mallows, in bad weather, with the wind from S.S.E. to West.

IRON GATES.—The outer shoal off Cuddan point is a small rocky patch with only 4 fathoms on it, called the Iron Gates, bearing S.W. ½ S., 2 miles from the point. The marks for it are, Acton castle to the eastward of the Hubble of Cuddan point, bearing N.E. ½ N.; the hummock on the Old Lizard head touching Rill point S.S.E. ½ E.; and the Mountamopus buoy N.E. Trithal engine-house in one with the Roman Catholic chapel at Penzance, bearing N. b. W., clears this shoal a mile to the westward. Between the Iron Gates and the Mountamopus there is a good channel three quarters of a mile broad, carrying a depth of from 6 to 10 fathoms. The mark to lead through is, Rogers tower or castle and Dinas in one with the Mount tower, bearing N. ½ W. westerly. Ludgvan church in one with the Mount tower, N. ½ E., or Acton castle to the westward of Cuddan point N.E., clears all the shoals off Cuddan point to the westward; and Trigoning signal-hill to the eastward of the town of Trewavas N.E. ½ E., clears all to the eastward.

PRUSSIA COVE.—From Cuddan point the cliffs do not vary until near Ynys rock, when they turn inwards to the bight, and gradually decrease in height to the low point near the Coast Guard station in Prussia Cove, which lies between the Ynys and Hoe point, the shore of which is composed of sand and scare,* and extends off nearly a cable's length from the bight. From the Coast Guard station to Hoe point the cliffs are from 65 to 50 feet in height, and again terminate in the bight which forms the north-west part of the Pra sands. From the eastern limit of Prussia cove to the end of the cliffs at the N.W. part of the Pra sands are a series of high detached rocks extending some distance from the shore; those off Hoe point lie nearly a cable's length from the cliff.

PRA SANDS.—The N.W. bight of the Pra sands is formed by the rounding in of the cliffs from Hoe point; from thence the land to the eastward continues very low for two thirds of a mile, forming between that point and Rinsey Head a small bay in which are the Pra sands, which extend from the shore from 1 to 1½ cables' lengths to the low water mark. From the eastern termination of these

* Rough ground, with high rocks scattered over it.

sands the cliffs increase in height, Rinsey Head being nearly 80 feet above high water, and continue with little variation until they reach Trewavas Head, which slopes to seaward, the cliff not exceeding 35 feet in height. A short distance to the south-eastward of the Pra sands the shore is composed of heavy masses of loose rocks, which lie off nearly two thirds of a cable's length; from thence to Trewavas Head the low water rocks are shelving and diverge from the cliffs, except in the two bights to the south-eastward of Rinsey Head; the one close to the Head having scare running off a third of a cable's length from the shore, and the other having flat rocks within, and sand without, extending off a cable's half length to low water mark.

WELLOE ROCK.—At two thirds of a mile to the S.W. ¾ W. of Rinsey beacon, and a good half mile from the cliff immediately below the beacon, lies the rocky shoal called the Welloe, which uncovers 5 feet at low water springs. The marks for the dry part are, Bessys house (which stands in the first bight to the westward of Prussia cove) in with the Ynys rock, bearing N.N.W. ¾ W., and Trewavas farmhouse in line with Rinsey mine counting-house N.E. b. E. ¼ E. The Hubble of Cuddan point in one with the Mount tower bearing N.W. b. N., leads to the southward of it.

GREAT ROW.—Another rocky shoal, named the Great Row, lies upwards of a mile to the S.W. b. W. of the Welloe, and has a depth of only 3 fathoms on it at low water springs, with foul and uneven ground on all sides. The marks for it are, Trewavas farmhouse on with the south gable of Rinsey mine counting-house, bearing N.E. b. E.; and Perranuthno church tower in line with the inner saddle of the Cuddan N. b. W. Madron Union in one with the Roman catholic chapel at Penzance, N.N.W. ¾ W., leads to the S.W.; and Trigoning hill open to the eastward of Trewavas farmhouse, bearing N.E. ¼ E., clears it to the south-eastward.

SUNKEN ROCK.—At 1½ cables' lengths from Trewavas Head, and at a third of a cable from the shore, is a sunken rock; and from thence to Porthleven, which lies nearly 1¾ miles to the S.E. of the Head, the cliffs rise to about 150 feet.

PORTHLEVEN.—The entrance to the tidal harbour of Porthleven is between the end of the pier, which extends off in a westerly direction to the distance of 413 feet, and the Deazle rocks (which cover when the tide has risen 5 feet), forming an opening of 240 feet in breadth, in the middle of which there are 8 feet at low water springs. At 1¼ cables' lengths within the entrance, the harbour curves to the northward, the distance between the inner pier heads being 140 feet. The entrance is directly open to the westward, and in all westerly winds a run sets into the harbour, making it unsafe to lie alongside the wharfs. There are 12 feet in the harbour at high water springs, and 8½ feet at neaps.

LOO POOL.—About a mile to the southward of Porthleven is Loo Pool, which is sometimes mistaken for the former. It forms a deep inlet of retained water, the entrance being blocked up by a bar of shingle 34 feet above low water springs.

From Porthleven the coast is low to Loo Pool, after which the cliffs rise from 50 to 200 feet, the shore between continuing sandy to within two thirds of a mile of Pedngwinion Head; from thence to Pradanack point the cliffs vary from 100 to 200 feet in height, and the low water rocks do not extend more than half a cable's length from the shore. A rocky patch called the Viziers lies N.W b. N. nearly 2 cables' lengths from Pedngwinion Head at about a cable's length from the shore, and is awash at low water springs. A rock also lies awash at low water in a W.N.W. direction about 2 cables' length from Pradanack point, called the Vradden.

MULLION ISLAND.—At a quarter of a mile to the north-east of Pedncrifton point is Mullion island, which rises 118 feet above high water, and is very precipitous on its W.N.W. side. Good anchorage will be found on the N.W. side of this island in strong easterly or south-easterly gales, in about 10 fathoms water, with the island bearing S. ½ E., and Mullion church E. ¾ S.; but great care must be taken to be in readiness to weigh if the wind shifts to the westward.

RILL HEAD.—From Pradanack point to the Lizard Head the cliffs vary

from 250 to 200 feet in height; and between them is Rill Head, at a cable's length off which are two detached rocks, bearing W.N.W. and S.W. b. S. from the Rill. At about half a mile to the south-eastward of Rill Head and close to the shore lies Kynance island, within which and to the eastward is Kynance sandy cove.

BOA SHOAL.—A rocky shoal called the Boa, having a depth of 6 fathoms on it, and which breaks very heavily in S.W. gales, bears from Rill Head W. ¾ N., distant 1½ miles, and from the Lizard N.W. b. W. 3 miles. The marks for it are, the eastern Lizard lighthouse in one with Old Lizard Head, bearing S.E. b. E., and the eastern extreme of Mullion island in line with Pedncrifton point N.E. ½ N.

DIRECTIONS from the WESTWARD.—In approaching the shore from the offing between the Land's End and the Lizard, the depths of water will decrease in tolerable regularity over a bottom generally speaking of coarse sand interspersed with whole and broken shells.

A vessel bound into Mount's Bay from the westward should, in order to avoid the Runnel Stone, bring Godolphin hill (which lies about 4 miles to the westward of Helstone) in one with Carn Du point, bearing about E. ½ N.; and as that point is approached, Mount St. Michael must be opened to the southward of it to clear the Buck rocks When abreast of Carn Du point, keep the Black rock or Tetterdu point well open to the southward of the Carn Barges to avoid the Lelland, after which the shore may be approached to within a quarter of a mile. In rounding into the bay, give St. Clement island a berth of about a cable's length; and after passing it, bring Trithal engine house in one with York house bearing N. ¼ W., which will lead to the eastward of the Low Lee and Carn Base rocks, and direct to the anchorage in about 9 fathoms, with the Mount tower in one with St. Hilary church spire bearing east, and the iron pole on the Gear rocks N. b. E. ¼ E.

FROM the SOUTHWARD.—In approaching the bay from the southward, when between Carn Du and Cuddan points, and proceeding in the line towards Gulval, the soundings will gradually decrease from 20 to 9½ fathoms at low water. In the latter depth, which is nearly 1¼ miles from the shore, haul to the westward for the anchorage. The best anchorage for coasters is farther to the westward in Gwavas lake in about 4½ fathoms, with St. Clement island shut in with Penlee point.

AT NIGHT.—The western limit of the Red light at Penzance is an excellent mark to vessels bound into the bay from the westward, as it leads to the eastward of the two very dangerous rocks, the Low Lee and Carn Base, which have only 4 feet on them at low water. It is also very serviceable as a mark for beating up for Penzance harbour, as the western limit clears all the dangers on the western side of the bay, and the northern limit the foul ground off the Bloon or Raymond and Cressars rocks in the northern part of the bay.

In standing into the bay from the eastward, if there is much ground swell on, a vessel should bring the Red light at Penzance on a N. b. W. ½ W. bearing before standing for it, by which means the Boa shoal, on which there are 6 fathoms, and the Iron gates, on which there are 4 fathoms, will be avoided, for during that time the sea breaks heavily upon them. In fine weather the seamen must use his own discretion when hauling to the northward, and we will only notice that the westernmost of the Lizard lights keep in sight bearing S.E. b. S. will lead up to St. Clement island.

Both Mount's bay and Gwavas lake afford very good anchorage, sheltered from all winds but those that blow from between S.S.W. and S.E., which send in a heavy breaking sea, against which few vessels could ride with any prospect of success, were it not for the powerful undertow, the resistance of which, as in Torbay, increases with the strength and duration of the wind, thus enabling them to ride easy. In the winter season, however, they ought not to be resorted to, but as a preliminary step, when wishing to enter the piers of Mount St. Michael or Penzance. Good anchorage will also be found on the N.W. side of Mullion island, on the eastern shore of the bay in strong easterly or south-easterly gales in about

10 fathoms water; the greatest care, however, must be taken to guard against a sudden shift of wind to the westward.

TIDES.—It is high water, full and change, at Newquay harbour at $4^h\ 20^m$, rise at springs 24 feet, at neaps 18 feet; at Portreath, St. Ives bay, and Gurnards head at $4^h\ 30^m$, rise at springs 23 feet, at neaps 17 feet; at Land's end at $4^h\ 15^m$, rise at springs 22 feet 7 inches, at neaps 16 feet 8 inches; and at Mount's bay at $4^h\ 27^m$, rise at springs 18 feet 7 inches, at neaps 15 feet 2 inches.

The LAND'S END may be seen in clear weather at the distance of 8 or 9 leagues, and when viewed from the south-westward and southward presents two apparently detached hummocks, on the westernmost and lowest of which a triangular elevation is visible. As the land is approached in this direction another hummock will present itself to the westward, with buildings thereon, and ultimately cape Cornwall will emerge from the horizon, the whole uniting as the vessel advances to the eastward. The most conspicuous buildings in the vicinity of the Land's End to the eastward, are the steeples of St. Buryan and Sennen, and the castle on Mount St. Michael, the former elevated 488 feet, and the tower of Sennen church 358 feet, above high water.

PEAL POINT.—From the Land's End to Guethensbras point the cliffs rise from 150 to 200 feet; and S. b. W. ½ W. 3½ cables' lengths from Peal Point, which is the north-western extreme of the Land's End, lies an islet called the Armed Knight, the summit of which is 88 feet above high water; the Peal Rocks lie N.W. ½ N. upwards of a cable's length from the point. At 1½ cables' lengths to the north-westward of the Armed Knight is a patch with only 2 fathoms on it, and off all the intervening points to Guethensbras point are a number of outlying rocks extending about half a cable's length from the shore, and which cover from a quarter to half flood.

LONGSHIPS.—About 3 miles N.N.W. ½ W. from Tol Peden Penwith, or the south-eastern point of the Land's End, and a mile W.N.W. from Peal point, are a group of high detached rocks called the Longships, on the largest and most elevated of which, stands a lighthouse, which exhibits a fixed light at 79 feet above high water. From the lighthouse the Brisons bear N.E. ¼ N. 3¼ miles; the Runnel Stone, S.S.E. southerly, nearly 4 miles; the Wolf rock, S.W. southerly, 7¾ miles; and St. Agnes lighthouse, W. a little northerly, 25 miles. The rocks extend S.S.E. ½ E. nearly half a mile from the lighthouse, and vary from 45 to 20 feet in height.

N.E. b. E. ½ E. two thirds of a mile from the Longships lighthouse, lies the Sharks Fin rock, which covers at two-thirds flood. It is steep-to, except on its western side, where a shoal extends off a third of a cable's length, with only 2 fathoms on it. A rocky shoal called the Kettles Bottom lies two thirds of a mile to the E. b. S. ¼ S. of the lighthouse, and covers at three-quarters flood; shoal water extends a quarter of a mile in a S.W. ½ S. direction from its highest part. Nearly in the centre of the group lies a small rock named the Fe-les, which covers at a quarter flood and has deep water around it.

DIRECTIONS.—Vessels sailing down channel, and bound round the Land's End, cannot discern the Longships light until it bears N.N.W. ¼ W. or opens of Tol Peden Penwith, and by bringing it on a N. ½ W. bearing they can steer safely for it, clear of the Runnel Stone, and may round the Longships at the distance of 2 cables' lengths, as the westernmost rock does not exceed half that distance from the lighthouse. When approaching the light from the south-westward, be careful to keep it clear of a N.E. bearing to avoid the Wolf rock; and having rounded the Longships, and bound to the north-eastward, do not bring it to the westward of S.S.W. ¼ W., which will lead about a mile to the westward of the Brisons.

Between the Longships and Land's End, a good channel will be found nearly half a mile in breadth, between the Kettles Bottom and Peal point, carrying a depth of from 8 to 11 fathoms water, but it is seldom made use of except by coasters. When in the middle of the channel, the highest part of the northern Brison will appear to the westward of the highest part of the southern or lowest Brison bearing N.N.E. ¼ E.

RUNNEL STONE.—Two beacons have been erected at Porthgwarrah, near Tol

Peden Penwith, to guide vessels clear of the Runnel Stone. The southernmost or outer beacon is of a conical form, and painted red; and the inner or northernmost has a large extended base, and is coloured black, excepting a small part of the pillar immediately above the base, which is painted white. When in one, bearing N. b. E. ½ E., they lead to the Runnel Stone, which lies three quarters of a mile from the shore, and covers at two-thirds flood. A Beacon has been erected on it, surmounted by a Ball, at 36 feet above high water, and a Black buoy bearing a staff and ball is moored in 16 fathoms water, between 30 and 40 fathoms to the S.W. ½ W. of the rock, with the two beacons nearly in a line bearing N. b. E., and the Longships lighthouse N.N.W.

The rocks in the vicinity of the Runnel Stone are as follows: The Lee Mean, which is awash at low water, bears from the beacon S.E. b. E. ¾ E. distant half a cable's length. The Carn Stone lies N.W. b. N. a cable's length from the beacon, and has 8 feet over it at low water springs. A rocky patch called the Lee Ore lies directly in the middle of the passage, between the Runnel Stone and the coast, at 4 cables' lengths in a N.E. ¼ E. direction from the beacon, and carries a depth of only 11 feet at low water; the marks for it are, the Longships lighthouse just open of Guethensbras high water point, bearing N.N.W. ½ W.; and a slated shed in one with Peden mean anmear cliff E.N.E ¾ E. A vessel to pass between this patch and the Runnel Stone, must bring the Longships lighthouse well open of Guethensbras point bearing N.N.W. ¼ W., and when St. Levan church opens of the land, she will be to the southward of all dangers; the passage, however, between the Runnel Stone and the land should never be attempted by a stranger. A rocky ledge of uneven ground, called the Poldew, also lies W.N.W. 3 cables' lengths from the Runnel Stone, having only 4 fathoms on it at low water, and 8 to 13 fathoms close-to. Godolphin hill in one with Carn Du Point bearing E ½ N. leads about two-thirds of a mile to the south-eastward of the Runnel Stone.

GUETHENSBRAS POINT to Logan rock the cliffs rise from 200 to 250 feet above high water, and form a number of deep inlets. Off the point the low water rocks extend in a W. ¾ S. direction for nearly 2 cables' lengths, the outermost covering at a quarter flood; from thence the low water rock, which lies a cable's length off Tol Peden Penwith, bears S.E. a third of a mile. S.E. b. E. ¾ E. 2 cables' lengths from Ella Point, lies a rock with only 6 feet on it; and at a third of a cable's length to the southward of the point is another rock which only shows at low water. To the eastward of Ella point there is a long bight called Porthgwarrah cove, and off its eastern point, which forms Por-chapel bay, a ledge of rocks extends S. ½ E. nearly a cable's length. A rock also lies S.W., half a cable's length from Peden mean anmear point.

ST. LOY COVE—From Logan rock, or castle Treveen, to Black rock, or Tetterdu point, the cliffs rise from 100 to 150 feet in height, with the exception of the low rocky shore of St. Loy cove, which lies between these points. In a S.W. ¼ W. direction from the Logan are two detached rocks, but the outermost is only a cable's length from the shore; and to the eastward lies the high water rock, called the Seghys. Penberth cove, which is used as a fishing station, lies half a mile to the eastward of the Logan. From Merthen point, which is the western extreme of St. Loy Cove, the low water rocks extend upwards of a cable's length from the shore, and due west half a mile from Black rock lies a sunken rock called the Tregiftian, carrying a depth of only 4 feet at low water. Carn Du point, open of Black rock point, bearing E ½ N., clears it to the southward.

SCILLY ISLANDS.

VARIATION, 24¼° WEST.

St. Agnes Lighthouse bears from the Longships nearly west, and 25 miles distant; from the Lizard W.N.W. 44 miles; from the Wolf rock W.N.W. ¼ W. 21 miles.

The SCILLY ISLANDS, and rocks in their vicinity, occupy a space of about 44 square miles. They may be discerned in clear weather at the distance of 5 leagues; and by night the light on the summit of St. Agnes island may be seen at the same distance; the reflectors therein are 138 feet above high water, and revolve once in the space of a minute; the lighthouse is whitewashed. On the eastern point of St. Martin stands an obelisk (painted red), somewhat in the form of a cone, and elevated 220 feet above the level of the sea, which, together with the Telegraph-tower, the Windmill, and the Fort on St. Mary, serve well to designate this dangerous group. The near approach to these islands from the south-westward and westward requires great judgment, by reason of the rocky ledges which project in those directions, the principal of which are the Nun Deeps, Crim, Bishop, Crebinack, Bishops Ridge, and Shovel. From the Nun Deeps the light bears S.E., from the Crim S.E. b. E. ½ E.; from the Bishop, E. ⅜ S.; from the Bishops Ridge, E. ½ N.; and E.N.E. ½ E. from the Shovel. The Crim, Bishop, Crebinack, and Bishop's Ridge, are each 4 miles distant from the light; the Nun Deeps and Shovel lie considerably within that radius. The Crim and Bishop are always above water, and the summits of each are somewhat sharp. When coming from the westward, therefore, during the night, be careful to give the light an offing of at least 6 miles, by which precaution you will pass 2 miles without the verge of the dangers alluded to, and as soon as the light bears E.N.E. ½ E. you may steer S.E. b. E. ½ E. which will carry you within 8 miles of the Lizard.*

The south-eastern shore of St. Agnes, St. Mary, and Menewethan islands, may be approached as near as half a mile, as there are no dangers to be apprehended without that distance. The Gilstone lies E.S.E. ¼ E. three eighths of a mile from Peninnis Head, and appears at low water. The preservation of the offing above alluded to is rendered doubly necessary, from the influence of the tide, which, a little to the south-westward of the Crim and Bishop, runs with great rapidity to the north-westward, north, and north-eastward, 8 hours out of 12.

The rocky ledge called the Poll bank, lies W.S.W. ¾ W. 6¾ miles from St. Agnes lighthouse, over which there is not less than 15 or 16 fathoms water. This shoal is surrounded by deep water, and is in no case dangerous, otherwise than to open boats in boisterous weather. Peninnis mill is one with Goreggan (a quarter of a point open to the eastward of the lighthouse), leads directly on it.

HARBOURS. This group of islands possesses several harbours for those vessels capable of taking the ground, and one also for large vessels, viz., St. Mary road, though the ground, being loose sand, is not very tenacious, and, indeed, this is the case generally, the anchors coming home long before a stay-peak can be obtained. The harbours in most esteem are Old and New Grimsby, and St. Helen pool. St. Mary road affords shelter against all winds, except those which blow from between W.N.W. and S.W.; these bring in with them a very heavy fetch, but with the wind in these directions a vessel can always run

* A lighthouse to be placed on the Bishop rock is now being constructed; it is to show a fixed bright light at 110 feet above high water, and will be visible at the distance of 14 miles; it is expected to be lighted about October, 1858.

to sea, through Crow Sound, at a proper period of tide; and to enable her to do this, the following periodic elevations of the Crow rock above the surface of the water are given. This rock is situated near Bants-Cairn, or Bantscarran point (St. Mary), and is remarkable in having three distinct heads called the Great Crow, the Little Crow, and the Crow Foot, by which the quantity of water over Crow Bar may be estimated with great precision:—

At high water, equinoctial tides, there are	23	feet on Crow Bar
At three quarters' flood, or one quarter ebb	19	,,
At half flood, or half ebb	13	,,
At one quarter flood, or three quarters' ebb	7	,,
At low water	3	,,

but more with westerly gales, and less with those from the eastward.

The Great Crow is nearly awash at 5 hours' flood.

The Little Crow is awash somewhat previous to 4 hours' flood, or after 2 hours' ebb.

The Crow Foot is nearly awash at one-quarter flood, or three-quarters ebb.

ST. MARY ROAD.—The anchorage in St. Mary Road lies between the isle of St. Mary and that of Samson, and there are five distinct entrances thereto: one between St. Mary and St. Agnes islands, called St. Mary Sound; a second between St. Agnes and Annet, called Smith Sound; a third between St. Mary and St. Martin, through Crow Sound, over Crow Bar; a fourth between St. Agnes and Samson island, called Broad Sound; and the fifth, called the North Channel, between Mincarlo rock and the Nun Deeps.

ST. MARY SOUND.—To sail into St. Mary Road through St. Mary Sound, bring the Great Minalto rock in one with the north-eastern side of Mincarlo rock, which will lead in the fair-way, between the Woolpack rock to the eastward and the Spanish and Bartholomew ledges to the westward; continue this course until the red day-mark on St. Martin opens to the westward of Bants-Cairn point, when you may steer directly for the anchorage N. b, E. ¼ E. The best position for anchoring is with Hangman island its own breadth open to the northward of the Nut rock, and distant from the latter one third of a mile to the south-eastward, in 4 or 5 fathoms' water. Moor N.W. and S.E., so as to ensure an open hawse with westerly winds. Peninnis Head and the Stevel rock are both bold close-to; but the Woolpack projects off from St. Mary nearly one fifth of a mile, and appears a little before low water; the Bartholomew ledge dries nearly at low water, and there are but 5 feet on the Spanish ledge at that period.

BROAD SOUND is mostly used by vessels from the south-westward, but is very dangerous to such as are not well acquainted with the marks and the set of the tides. Run in between the Bishop and the Crim, but nearest to the former; they are the westernmost rocks of Scilly, and partly above water. The leading mark is Nornour island, its apparent length open northward of Bants-Cairn point, about E. ¼ N. In proceeding with this mark, the Gunner, Southward ledge, and Le Jeffry, will be left to the northward, and the Old Wreck to the southward, and after passing them it will take you direct to St. Mary Road, where you may anchor as before. The Old Wreck is a sunken rock, with 3 feet on it, lying about N.N.W., a quarter of a mile from Annet Head, and N.W. b. W. ¾ W. from the Great Smith.

The NORTH CHANNEL is as dangerous as Broad Sound to strangers. The best mark is, St. Agnes lighthouse in one with the Great Smith till the leading mark for Broad Sound comes on as above.

TIDES.—At the Bishop, and also at the Crim, the flood-tide sets to the north-westward during the first half-hour, and afterwards to the eastward through St. Mary Road.

S.E. and south of St. Agnes island there is a great rippling or overfall, between 4 hours' flood and 2 hours' ebb, occasioned by the confluence of the two streams of tide there at that period. This ebullition is further augmented by the unevenness of the ground over which the water runs; and sometimes extends as far seaward as 3 miles, but gradually subsides as the tides assimilate.

Although the chart of these islands, constructed by Mr. Græme Spence, appears to be minutely correct in every particular, it is, however, recommended to strangers not to attempt the harbours of Scilly without pilots; and their attendance may always be depended upon, from one quarter or the other, even in the worst weather, as soon as the signal for that purpose is made; their conduct on these occasions is universally marked with attention, skill, and intrepidity.

THOMPSON ROCK.—The many attempts made to discover the situation of this rock, under almost all circumstances, have not elicited the least symptom indicative of its position.

The SEVEN STONES are a cluster of very dangerous rocks, lying nearly in the fair-way between Scilly and the Land's End; the north-westernmost of which, the Pollard, is in latitude 50° 2′ 23″ N., and longitude 6° 6′ 47″ W., and bears from the day-mark on St. Martin E.N.E. ½ E., distant 7 miles; from the Telegraph on St. Mary, E.N.E. ¼ E., distant 9½ miles, and W.N.W. ¼ W. 14¾ miles from the Long-ships lighthouse. The Pollard appears at half ebb. The South Stone lies S.S.E. ¾ E., two thirds of a mile from the Pollard, and appears at 5 hours ebb. There are several other sunken rocks in the vicinity of these two, particularly to the northward and eastward of the Pollard, and to the westward of the South Stone; the former are generally called the Town, and partially appear between the periods of 4 hours ebb and low water; the latter have no particular designation. The whole of this group are very steep; there are 38 and 40 fathoms water, at the distance of one mile only, on all sides. The only marks for the position of the Pollard, which can be rendered conspicuous or intelligible to a stranger during the day, are, viz., the Telegraph tower on St. Mary in one with the north-western end of Nornour island, or Bants-Cairn point open to the eastward of Carniweather point; and the marks to avoid all these rocks are as follows: the Telegraph tower on St, Mary open to the eastward of the easternmost Cairn of Great Ganilly (it will be also open at the same time to the eastward of the remarkable conical-shaped rock, called Hanjague, or Hinjack), and the Telegraph shut in to the westward of Carniweather point (though its parapet will still appear over the land between the said point and the day-mark); the former mark will lead half a mile to the south-eastward of the South stone and of the rocks near it; and the latter will pass half a mile at least to the westward of the Pollard and the rocks in its vicinity.

FLOATING LIGHT.—A Light-vessel is placed off the Seven Stones, and as long as she holds fast in that exposed situation there will be no difficulty in the passage between them and the Longships. She is moored in 40 fathoms water about 1½ miles E. ½ S. from the Pollard, and about the same distance E. b. N. from the South Stone, and carries two Fixed lights on separate masts 20 and 38 feet above the sea. St. Martin day-mark bears from her about W. b. S. 8¾ miles, the Longships lighthouse E.S.E. 13 miles, and the Wolf S.S.E. ¾ E. 12 miles.*

In very fine weather the objects on the Land's End may denote the position of the Seven Stones; for instance, the two churches of St. Buryan and Sennen in one will pass over the rocks to the north-eastward of the Pollard, and about half a cable's length distant therefrom.

The WOLF ROCK lies E.S.E. ¾ E., 21 miles from Scilly lighthouse, 24 miles W.N.W. from the Lizard point, and is only 1¼ miles to the northward of a supposed straight line drawn from the former to the latter. It is in latitude 49° 56′ 32″ N., and in longitude 5° 47′ 30″ W., and appears about 20 fathoms in length, and 15 in breadth, at low water great spring-tides. A Beacon has lately been erected upon it, consisting of a cone bearing a mast with a large ball on its summit, at an elevation of 46 feet above high water level, but this ball is occasionally washed off by the heavy sea.

The Wolf is very steep on all sides, and is awash at high water neap-tides,

* In many cases it may be of essential consequence to the navigator of a dangerous channel, like that between the Scilly islands and the coast of Cornwall, to know the real set of the tide; and the following table is therefore given to show its constantly rotary action during both flood and ebb.

though covered on spring floods; it will, however, if the Beacon be destroyed, generally betray itself by the breakers unless the weather is unusually serene. There are 34 fathoms within a mile of the rock on all sides, 38 fathoms in the stream of it eastward and westward, and between it and the land from 34 to 37 fathoms. The long eastern mark to clear this rock on its southern side is, the two Lizard lights in one, or the eastern light open to the southward of the western light, but by no means open to the northward of it. The lights in one, will lead at least 3 miles to the southward of the Wolf; but they can be seen at this distance only in very clear weather, and from the deck of a vessel somewhat elevated. In the day-time, when neither the rock, the beacon, nor the breakers can be discerned, which, however, is very seldom the case, Mount St. Michael in one with Lamorna or Carn du point, bearing E.N.E., will lead about 3 miles to the eastward of it, as will also the Brisons touching the Land's End; and the Longships lighthouse directly in one with Cape Cornwall, bearing N. E. ½ E., will lead at least a quarter of a mile to the westward of it.

DIRECTIONS.—When running up the Channel during the night, or in thick weather, do not approach Scilly within 60 fathoms, as you will not in that depth be more than 5 leagues from the islands; neither come into less water, when between Scilly and the Lizard, than 44 fathoms, by which precaution you will pass at least 2 miles to the southward of the stream of the Wolf, the parallel of which cannot be approached, eastward or westward of the rock, so long as you preserve that depth of water.

Vessels navigating between the Scilly Islands and the Land's End should keep the Seven Stones light vessel to the westward of north when going to the northward; and to the westward of south when going in the contrary direction. From the Longships lighthouse the Wolf bears S.W. southerly, and is distant nearly 7¾ miles; be very cautious, therefore, when passing it on either hand from the southward, not to bring the longships on that line of bearing; the same precautions are of course necessary when approaching it from the northward. In

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The following observations were made and registered on board the Seven Stones light vessel on the 24th of April 1842, it being full moon on that day at 11h 27m pm. :—

Set, magnetic.	Mean Time at which the Stream came to each point.	Set, magnetic.	Mean Time at which the Stream came to each point.
	h m		h m
Western stream ceased; low water	9 45 A.M.	E. b. S.	4 28
W. b. N.	9 50	E.S.E.	4 30
W.N.W.	10 5	S.E. b. E.	4 33
N.W. b. W.	10 15	S.E.	4 36
N.W.	10 33	S.E. b. S.	4 55
N.W b. N.	10 47	S.S.E.	4 57
N.N.W.	11 0	S. b. E.	5 2
N. b. W.	11 15	South	5 12
North	11 35	S. b. W.	5 14
N. b. E.	12 0	S.S.W.	5 14
N.N.E.	0 15	S.W. b. S.	5 17
N.E. b. N.	0 38	S.W.	8 15
N.E.	3 15	S.W. b. W.	8 40
N.E. b. E.	3 44	W.S.W.	8 55
E.N.E.	4 6	W. b. S.	9 30
E. b. N.	4 12	West	9 45
East	4 21	Western stream ceased; low water	10 0
Eastern Stream ceased; high water	4 24		

RICHARD SIMMONDS, *Master.*

thick weather, or in the night, this rock is the more dangerous, as it does not give the warning by sound usually ascribed to it, except on sudden transitions from foul to fair weather, or *vice versâ*.

TIDES.—Off the mouth of the channel the stream, although materially influenced by the indraft and outset of the Channel, will be found running to the *northward and eastward*, while the water is *falling* at Dover; and to the *southward and westward* while it is *rising* at that port. The particular direction given to the stream in this part of the sea, by the meeting of the channel and of the offing tides, is shown in the tide tables (Compartment I.) for the English and Irish Ports, published by the Admiralty; and it is only necessary to mention here, that to the southward of the parallel of Scilly, the tides of the channel and offing blend together with varying force and direction, and occasion the stream to be constantly changing, and in some places even to make the entire circuit of the compass in one tide, without ever remaining long upon any one point. So that any written description of their course is rendered almost impossible, and the table alone must be consulted for the direction at any particular hour. From this revolving motion of the stream, it has been asserted that a vessel can never be carried far in any one direction by the tide. Such, however, is not the case; for although it may be true that while at anchor in a particular spot the vessel's head will turn to every point of the compass, yet directly she is loose she will be carried away upon a rhomb depending upon the state of the tide at Dover.

At Scilly it is high water at full and change at $4^h\ 42^m$; rise at springs 19 feet, at neaps 12 feet. In running between Scilly and the Lizard, the set of the tide is of great importance, especially with southerly and south-westerly winds. Between the periods of high and the following low water, by the shore, the stream runs south-easterly, southerly, and south-westerly, or *from* the Wolf; whilst from low water to the succeeding high water, it sets north-westerly, northerly, and north-easterly, or *towards* that rock. This peculiarity extends to a supposed radius of 4 leagues from the rock, whence, as you approach either Scilly or the Lizard, the tides partake of the influence of the land.

SECTION IX.

LAND'S END TO MILFORD HAVEN, INCLUDING THE BRISTOL CHANNEL.

VARIATION, 24° WEST.

WHITESAND BAY, formed between Cape Cornwall and the Land's End, has a rock in it called the Bounder, with 3¾ fathoms over it at low water. It lies with Mathew's house in one with Sennen church, bearing S. b. W. Vessels will ride well sheltered from easterly winds in from 12 to 15 fathoms outside this rock at about two thirds of a mile from the shore, with cape Cornwall bearing N.N.E. ¾ E. Sennen cove lies within Peden mean point, and the Seine boats are protected by the rocks without called the Bo Cowloe and Bo Col, which are awash at high water springs. The Little Bo or outermost rock covers at half flood, and lies nearly a third of a mile from the shore with the point bearing S. ¾ W.

CAPE CORNWALL.—The coast from Watch Hill point to cape Cornwall, which rises 197 feet above high water, is deeply indented, the cliffs varying from 50 to 100 feet in height, and many of the points forming like islands. The cliffs from the cape to Gwynver sands are from 300 to 20 feet in height, after which they rise to 190 feet at Gamper point; from thence they average about 200 feet to Peal point. N.N.W. ½ W. from cape Cornwall, and at a third from the shore, are a group of detached rocks called the Vyynecks, which cover at a quarter flood. They lie with the Longships lighthouse touching the eastern shoulder of the smaller Brison, bearing S.W. ¼ S.

BRISONS.—Off cape Cornwall are two rocky islets called the Brisons, elevated respectively 90 and 71 feet above high water, and bearing from the cape W. ½ S. half a mile, and N.E. ¼ N. 3⅓ miles from the Longships lighthouse. In-shore of them to Pol Pry point are various rocky ledges which cover at a quarter flood, and shoal water extends nearly a cable's length S.W. b. W. ½ W. from the lower islet; and at the same distance W. ¾ N. lies a small patch of only 16 feet. The two Brisons in one N. b. E., clears the outer Greeb and all the ledges to the westward; and Nanjulean mill open in the valley bearing S.E. ¾ E., leads to the southward.

ST. IVES BAY is formed between Godrevy island and St. Ives Head or Battery point, which bear from each other east and west, and is 3¼ miles in breadth, and 1¾ miles in depth from low water mark, and open to the northward. Its eastern shore is bounded by Godrevy head, a bold headland rising 139 feet above high water, off which lies Godrevy or Gull island, with a rocky passage between, of upwards of a cable in breadth. A detached islet lies on the north-west side of the island, and its south-eastern side is studded with small detached rocks, only visible from half tide to low water. A rocky ledge called the shore Lanner extends off half a cable's length to the westward from its western side, and is visible at low water.

STONES.—Two thirds of a mile N.N.W. ½ W. from Godrevy island, lies the easternmost rock of a cluster called the Stones, which extend half a mile in a N.N.W. direction, and cover from the first quarter to two-thirds flood. The passage between the eastern rock, called the Quarter tide rock, and the outer one, named the Hevah, carries a depth of from 3 to 7 fathoms, but it ought never to be attempted except in cases of emergency. A strong tide sets through them E.S.E. ½ E. and W.N.W. ½ W.

In passing between the stones and Godrevy island, bring the apex of Trecobben hill between Carrack Gladden farm house and the fishery Beacon house, bearing S.W. b. W. Gurnards Head just open of Carnmen point, bearing W. ½ S., leads

a third of a mile to the northward of the Stones; Gwinnear church in line with the eastern side of Godrevy island bearing S. ¼ W., leads to the eastward; and Gwinnear church in one with the old railway engine chimney bearing S. b. E., leads a third of a mile to the westward.

CERES and BESSACK ROCKS.—At a good mile from Godrevy Head, within the bay, at low water mark, lies the Ceres rock, which covers at two-thirds flood; and lying off it to the N.N.W., and at nearly half a mile from the high water mark, is the Bessack rock, which covers at a third flood. To clear the latter to the northward in 6 fathoms, keep Lelant church just open of the Black cliff, bearing S.W. ½ W. The shore from the head to the mouth of the river Gwythian, which flows into the sea at 6 cables' lengths to the southward, gradually slopes, having masses of rugged rock extending off to low water mark. From thence a long range of lofty sandhills from 100 to 150 feet in height, and covered with star grass, extend to the entrance of the Hayle estuary which lies at the bottom of the bay. The beach is composed of fine sand and shell, running out 2 cables' lengths, but its level is continually altered by gales of wind.

HAYLE ESTUARY is formed by several small rivers, which take their rise some distance inland. The south-eastern portion runs by St. Erth in one stream, and from thence discharges itself into the sea; the eastern or Copper house river falls into the channel about a mile from the mouth of the estuary, and at the head of the embankment they both join, and form what is now called the Hayle river.

HAYLE LIGHTS.—On the rising ground on the western side of the entrance at 650 feet from Chapel Anjou point, stand two lighthouses built of wood, bearing Fixed lights which are only shown when there are 12 feet of water over the bar. The high lighthouse is triangular, painted red, and stands on three legs, the centre of the lantern being 80 feet above high water; the low lighthouse is nearly square, painted black, and stands on four legs, the centre of the lantern only 59 feet above high water. When in one they bear N.N.E ¼ E., and S.S.W. ¼ W., distant 296 feet, and lead through the best part of the channel. A pole is also erected off the Ferry house, on which a flag is hoisted on the arrival of steamers belonging to the port, if there is sufficient water for them to enter.

On the western side of the entrance an embankment has been run out in a northerly direction, 1929 feet from Chapel Anjou point, having five perches erected on it, and a small buoy to mark its extremity. On the eastern side Black buoys are placed to mark the channel; the outer one is a can buoy, and the rest are square with rings for warping. The Black nun buoy on the bar, has no distinguishing mark on it. There is a dock at Hayle capable of admitting a vessel drawing 14 feet at ordinary springs.

ST. IVES.—From Hayle estuary to Pedn-olver point, the coast is composed of bold sloping rocky cliffs, occasionally covered with verdure, having three sandy coves; from thence it gradually rises to St. Ives Head, which is 80 feet above high water, and bold-to within a cable's length of the shore.

At a quarter of a mile to the southward of the Head, lies the harbour and town of St. Ives. It is a tidal harbour formed by a pier on its northern side, running out S. b. E. ½ E. 168 feet, and then in a S.W. ¼ S. direction for 330 feet. A lighthouse built of stone, 24 feet high, stands 36 feet from the pier head, and exhibits a Fixed light, which is only shown when there are 10 feet water on the pier gauge; but it is difficult to distinguish it from the lights of the town.

The bottom in the harbour is composed of fine sand and shingle, and there are two buoys with rings attached, for the purpose of making fast bow moorings; but on account of the ground swell, which is severely felt on this part of the coast, and the short extent of the pier affording such small shelter, it is difficult at that time to secure the vessels in the harbour. There are 14 feet in the harbour at high water springs, and 8 feet at neaps. A ridge of sand at low water extends from the end of the pier to Pedn-olver point. The best anchorage in St. Ives bay is in 9 fathoms water, with the Battery point bearing N.W. ¼ W. and Pedn-olver point W. ¼ S.

CARAKS.—From St. Ives to Gurnards Head, the coast is rugged and indented, the height of the cliffs averaging about 250 feet above high water. To the westward of Carnmen point lies a mass of rocks called the Caraks, the largest of which

rises 25 feet above high water; the rest cover at a quarter flood. The outermost rock lies N. b. W. ¼ W. 2 cables' lengths from the shore. From the Caraks, the outermost of the Carlow rocks bears W.S.W. ¼ W. distant three quarters of a mile, and lies 2¼ cables' lengths from the shore. It covers at three quarters flood.

GURNARDS HEAD rises 185 feet above high water, and is rugged and steep, and surrounded with a mass of detached rocks, the largest of which, named the Ebal, lies north nearly a cable's length from the Head, and covers at high water springs; from thence to the Three Stone Oar, which bears W. ¼ S. 3 miles, the cliffs vary from 50 to 100 feet in height.

CARNELLOW SHOAL.—A small patch called the Carnellow shoal, with only 3½ fathoms on it, lies to the eastward of Gurnards Head, with the north extreme of the Ebal rock bearing W. ¼ S., and the northern house of Trereen farm in one with the Old Mine Chy S.S.W. ½ W. There is also a small rock, called the Carnellow, a cable's length to the S.E. b. E. of this patch, with only 6 feet water over it.

GREEB POINT.—From Gurnards Head to Greeb point the coast should not be approached to within a third of a mile, for a small rock, which uncovers only a foot at low water springs, lies W.S.W., three quarters of a mile from the Ebal rock, at about 2 cables' lengths from the shore; and a ledge of rocks extends in a north-easterly direction upwards of a cable's length from Greeb point.

The MOZEN ROCKS lie off Pendeen cove, in an E.N.E. direction, and cover at a quarter flood. Their northern extremity bears S.E. b. E. ½ E., half a mile from the Three Stone Oar.

The THREE STONE OAR rocks lie a third of a mile to the north-eastward of Watch Hill point, and never cover with ordinary springs. The passage between them and the point should not be attempted by a stranger. The three rocks called the Skinvyynecks lie in a north-westerly direction from Watch Hill point, at 1½ cables' lengths from the shore. The two inner rocks cover at two-thirds flood, and the outer one is awash at low water. The Avarrak rock bears S.W. b. W., three quarters of a mile from the outer Three Stone Oar and covers at half tide. The Manver rock covers at half flood, and lies two-thirds of a cable's length from Botallack Head; and the Cok le Marny rock, which resembles a boat turned upside down, lies a cable's length in a northerly direction from the Head, and also covers at half tide.

PORTREATH tidal harbour, which is chiefly used by coasters loading copper ore or discharging coals, bears from the Boden rocks S.W. b. W. 4¾ miles. Its entrance is easily known by a white tower, called the Day Mark, which is 123 feet above high water. The pier is on its eastern side, and runs north and south, and there is an inner and outer basin within which will contain about 25 vessels of 150 tons burden.

Should a vessel get embayed between St. Agnes Head and Godrevy island, and be under the necessity of running on shore, the best place for beaching is under Amys point on the western shore of the harbour at the top of high water, where, in most cases, the crew would be saved.

ST. AGNES HEAD.—St. Agnes hill rises gradually to an elevation of 617 feet above high water, without which is St. Agnes Head, a bold-looking land, with the two high rocks called the Boden, or the Man and his Man, lying about three quarters of a mile off it, in a N. ½ E. direction from the hill. From these rocks Godrevy island bears W. b. S. ¼ S., distant 8½ miles. The cliffs from St. Agnes Head to Portreath, which lies 4 miles to the south-westward, vary considerably, averaging from 200 to 150 feet in height. A deep rocky bight lies on the eastern side of Portreath called Goodern, and care must be taken not to mistake the harbour for it; from thence to Godrevy island the height of the cliffs is about 250 feet, and off the coast lie a number of remarkable islets at about 1¼ cables' lengths from the shore. The principal are the Horse, and Basset, near Portreath, rising respectively 86 and 100 feet above high water. Two thirds of a mile to the S.W. are the Crane islands, 126 and 121 feet above high water; and a third of a mile in the same direction are the Samphire islands, 91 and 148 feet above the same level. From thence to Navax point the low water rocks do not extend above half a cable's length from the shore. Off Navax point lie the Thigger rocks, at about a cable's *length from the* shore.

NEW QUAY HARBOUR.—New Quay bay lies to the eastward of Towan Head, and on its western side is the tidal harbour of New Quay, which is formed by two piers; the southern pier takes a N.N.E. ½ E. direction for 410 feet, and the northern pier a S.E. direction for 182 feet. On the southern pier-head stands a tower with a flagstaff.

The area of the harbour is from 3 to 4 acres, and is frequented by vessels drawing about 13 feet water. The bar has 19 feet on it with a 24 feet tide, and 13 with neaps of 18 feet, but the depth occasionally varies, for with a continuance of north-easterly gales, the sand is carried out of the harbour to the depth of 2 feet, and it again accumulates in moderate weather.

The entrance, which is open to the south-eastward, is 80 feet across; but during northerly gales a heavy sea sets in, which causes the vessels which lie on the south-eastern side of the harbour, with stern-ropes made fast to the southern pier, to strike hard on the ground, which is sand. Off the entrance, and for some distance outside, the sea breaks heavily. Water in abundance is obtained from a well in the cliff.

TREVOSE HEAD.—On the north-western part of Trevose Head stands Trevose Lighthouse, from which are exhibited Two Fixed lights; the lower one is 50 feet in advance of the higher, and 129 feet above high water, and the upper one 204 feet.

The coast between Trevose and Towan Heads (which bear S.W. ½ S. and N.E. ½ N. 8 miles from each other) is high and precipitous, and deeply indented. There are two bights or coves in the bay formed between Park Head (or St. Eval point) and Towan Head; the one, called Mawgan Porth, which lies 3½ miles to the E.N.E. of Towan Head, is shoal at its mouth, and open to seaward; and the other, named the Porth, is 1½ miles to the eastward of the Head, and is also open to the westward, but dries at low water; it is, however, frequented by small vessels to unload coal.

Within Trevose head is Polventon bay, in which vessels may shelter until they can run into Padstow harbour; this little bay lies 3 miles from Padstow harbour, W. ½ N. With the wind from S. to W.N.W., vessels may anchor in from 5 to 7 fathoms, good sandy ground. With north-westerly winds, haul close round the small rocks called the Madraps, on the east side of the head, anchoring within a cable's length of them, the westernmost of them bearing about N.N.E. If caught on the coast by a N.W. gale, and not able to get off, you may come-to here, and wait the flood until safe to run for Padstow.

From Trevose head to Steppey point, the west of Padstow harbour, the bearing is E. ¼ S., distant 3½ miles. From the same head to Tintagel head, E. ¾ N., 12½ miles; and Hartland point, N.E. b. E. ½ E., 34 miles.

The GULL is a bold rock 2¼ miles E. b. N. from Trevose head, which lies with a beacon upon Stepper point, bearing S.E. b. E., 1¼ mile distant. A ledge lies ¾ of a mile S. ½ W. from the Gull, and nearly the same distance from the shore; it is called the Gurley, over which is only 4 feet at low spring tides. From the Gull, about a mile S.E. b. S., and half a mile from shore, is a sand-bank, having only 9 feet water. Between the Gull rock and the shoals, the leading mark is the second islet of the Quies, well open of Trevose head, which mark may be kept on to the entrance of Padstow.

The NEWLAND is another islet, lies 2¼ miles east of the Gull, and N. b. W. ½ W., half a mile from Pentire point. Between the Newland and the shore, about one-third of the way, is a rock called King Philip, having 3 feet water at ebb tide. The Mole lies to the eastward of Pentire, and small rocks called the Rumps to the west of the Mole.

PADSTOW HARBOUR.—The entrance to the harbour of Padstow is bounded by Stepper and Pentire points; they bear from each other about N.E. and S.W. and are distant 1½ miles. Off Pentire point N.N.W. distant nearly a mile, is the Newland rock, high, large, and steep-to; and S.E. of the Newland is a sunken rock called the Viller, having between it and the Newland, King Philip's rock, the Roscarrock rock, near Pentire point, another rock called the Mole, to the eastward, and the Rumps, &c., close to the point, making the channel between

the Newland and Pentire point somewhat hazardous; the best passage, therefore, to Padstow will be between the Gull and Newland, where midway you will have 15, 12, 9, 8, 7, and 6 fathoms water, gradually decreasing as you approach the entrance of the harbour. A conspicuous tower or day-mark has been erected on the high land, a quarter of a mile to the westward of Stepper point, and two miles from the entrance there is a pier where vessels may lie aground in safety.

It frequently happens in the winter season with gales of wind at N.W. and N.N.W., that ships are lost on this coast for want of a proper knowledge of the harbour of Padstow, which is a good and safe place for ships of large burthen, having never less than 3 fathoms at low water in the channel, which, in the narrowest part is 70 fathoms wide, and is bounded on the west by a steep cliff, which is bold to, and on the east by the Dumbar sand, which dries with the last quarter of the ebb, and ought to be carefully avoided. In approaching the harbour from the offing, steer in for the beacon or day-mark, passing between the Gull and Newland rocks, or if circumstances require, you may sail between the Gull and Trevose head, keeping the Quies a handspike's length open of Trevose head, to avoid the Gurley. When within half a mile of the day-mark you will perceive Stepper point, on the extremity of which is a pole, with a barrel thereon.

On entering the harbour, keep very close to Stepper point, to avoid the Dumbar sand, on the outer end of which a red buoy is placed, which must be left on your port side. If the tide is ebbing, keep a press of sail until within the entrance, and have an anchor ready: run in, and should the eddy winds from the hills take the sails aback, then let go the anchor, by which time the boats will be ready to board from the shore, and render the necessary assistance. The best time of tide to enter the harbour is from half flood to high water, and it should not be entered from half-ebb to quarter-flood, except under circumstances of necessity.

A little within the entrance of the harbour, mooring buoys are placed, nearly in the mid-channel, and on shore, capstans are erected, posts fixed at proper intervals, and warps, boats, pilots, and other men, are in readiness to render assistance to vessels entering the harbour. The harbour may be occupied at all states of the tide, in smooth water, with a free wind, but it is recommended to ships of large draught to wait till about half flood, and when in the harbour-cove, which is about a mile within the point, they may lie on mud, or ride afloat, as occasion requires. This harbour is a most excellent outlet for ships bound to the northward or eastward.

In sailing out to the northward, you may go between Pentire point and the Newland, but beware of the rocks under water which have been already described. To the eastward and near the shore, is an island or rock, called the Mole, and following the shore, you will meet with the small cove of Portquin.

PORT ISAAC.—One mile and a half to the eastward of Portquin is Port Isaac, a fishing place, frequented by vessels trading to Bristol, Wales, Ireland, &c. Ships of 200 tons go in at high water, and run on the sandy shore, where they lie safe from the power of the sea. It is principally used by fishing vessels.

About 4 miles from the entrance to Port Isaac is the Otterham rock, which is 133 feet above water, and is upwards of a quarter of a mile from the shore. One mile and a half further is Tintagell head, and to the eastward of Tintagell head, 2½ miles, is the cove of Forrabury. The coast all the way from Pentire head to Hartland is rocky and steep, and you may sail along within half a mile of the shore in from 6 to 11 fathoms, free from any danger. About 7 miles from Forrabury there begins a flat, which spreads itself before the coast for a considerable distance, this is called Bude bay, in which there is little or no tide; this flat is shallow, having from 3 to 1 fathom, drying as you approach the shore.

From Pentire point to Port Isaac the distance is 3¼ miles, and from Port Isaac to Hartland point 28½ miles, the course being N.E. ½ E.

From Cape Cornwall to Hartland point the course is E.N.E., and distance 24 leagues; and from St. Martin's day-mark to Hartland point, the course is E.N.E. ½ E., and distance 30½ leagues.

Extract of a letter from a commander of the royal navy, addressed to the secretary of Lloyd's:

"Of course it is well known that there is no harbour on the north coast of Cornwall, from the Land's-end to Hartland point, but Padstow; but it is not so well known that this harbour should never be approached in a gale of wind but with a coming tide, or, at the latest, to enter the harbour within the first hour's ebb, and then to keep close to the western shore. When I say close to the western shore, I mean within two or three lengths of the vessel from the rocks at Stepper point, carrying all the sail possible up to the moment that the wind begins to baffle within the point, when an anchor should be let go; veer out about 20 fathoms of cable, sheer toward the rocks, and let go the second anchor, and veer to about two-thirds of a cable on the first anchor; furl the sails, and, if possible, run a hawser to the rings. And I would earnestly call the attention of the committee to these observations, for they are not only mine, but the respectable masters of vessels of the place will corroborate what I have above stated, and ought (not only for the advantage of the underwriters, but the saving of a number of lives) to be made known by every means that can be devised, and more particularly in the printed sailing directions for the coasts, which decidedly give too favourable a description of the access to the harbour, and is not sufficiently explicit in its direction in keeping close to the western shore. These instructions say also—'The harbour may be used at all times of the tide, with the wind free, from N. b. W. to E.S.E.' Now this, as a sailor, I positively deny; for I was, with many others, an eye-witness to the wreck of three vessels at the mouth of this harbour on Thursday, and a fourth all but gone, by running for it at an improper time of tide, and this with the wind right at N. b. W. The want of knowing these facts has been the cause of the loss of many valuable lives and hundreds of thousands of pounds of property.

"A sloop that kept too far off the western point was swallowed up by a sea, and all hands perished, before she touched the ground; another schooner might have been saved had there been a hawser a little within the point, to have run to her the moment she got into the baffling winds, and this, in my opinion, would be the means of saving many a vessel, were it adopted. Another schooner, running for the harbour, prudently altered her course, and beached in Hillbay, and saved their lives, as also did a sloop at port Quin, and another at Widemouth bay.

"As a sailor, I make another observation, with great regret, and that is, that out of seven vessels in two days that ran for this harbour and arrived safe, I can observe but one that has two cables bent; this is inexcusable in the masters of those vessels in running for a lee shore in a gale of wind.

HARTLAND POINT, the N.W. extremity of Devonshire, lies 24 leagues E.N.E. from Cape Cornwall, and 30½ leagues E.N.E. ¾ E. from St. Martin's Head, Scilly. From Hartland point to Baggy point, the bearing and distance are E. ¾ N. 12 miles: between, the coast forms a capacious and deep bight called Barnstaple or Bideford bay. The land of Hartland point is high, and directly off it lies a ridge of rocks, extending about one-third of a mile from shore, on which the sea almost always breaks, and must therefore be carefully avoided. About a mile to the eastward of the point is an anchorage, called Shipload bay, but without shelter.

CLOVELLY PIER, which is small, and fit only for protecting fishing boats, lies about 4¾ miles S.E. ½ E. from Hartland point. There is an anchorage off the pier, where vessels bound to the southward may lie sheltered, during the summer season, from southerly winds as far as S.W., in 8 or 9 fathoms water; the anchoring marks are, the easternmost house but one on the beach in a line with the pier, and the land to the westward shut in with Gallendy bower, which is also to the westward of Clovelly, and has a tuft of trees on it.

About 2 miles E.S.E. from Clovelly pier lie the Buckish rocks, called also the Bucks and Gore; they are directly off a summer-house on the hill, and about half way between Clovelly and the village of Bucks. The land to the westward open of Gallendy bower clears them on the north side. The coast hence, trends on the north-eastward 6 or 7 miles to Barnstaple or Bideford bar: the shore is moderately bold, excepting off a white house a little to the westward of Shepherd's

Hill, where at a short distance from the shore, there is a sunken rock, on which the sea breaks at low water.

BIDEFORD HARBOUR.—Rock's Nose is remarkable as the termination of the high rocky coast of Barnstable bay; as from it the shore stretches 5 miles N.E. b. N. with a succession of low sandhills, and the extensive flats known as Northam and Braunton Burrows, terminating at Downend Bluff. The gap and bar of Barnstaple divide the flats into two parts, and here the waters of the Taw and Torridge, the rivers of Barnstaple and Bideford, fall into the sea. The bar, of coarse sand and gravel, is variable, and extends outward nearly a mile and a half from the high water entrance between the Burrrows.

Barnstaple or Bideford bar lies 11 miles E. b. S. from Hartland point: it has a sufficient depth of water on it at half flood, for ships of 300 tons burden; but it is dangerous to a stranger, because there are shoals a long way out on both sides. With winds from S.W. to N.W., and blowing hard, there is a heavy sea on it; and even with moderate winds from these quarters, a ground swell breaks over it. At low water spring tides there is not more than 2 feet on it. The vertical rise is 25 feet: neap tides rise no more than 12 feet.

The shoal which constitutes the bar rises suddenly from 3 fathoms on the outside, as well as from a pool within, of the same depth, to a depth of only 6 feet, and this to the extent of a mile. The breadth of the channel, near the entrance, is contracted by the South Tail, a patch of sand, on the starboard side, which uncovers 4 feet above the level of low water. Within this bank, on the same side, is the Middle Ridge, a bed of gravel, forming the south side of the channel, and rising 12 feet above low water; and on the opposite side of the passage is the High Patch of the Crumbles, which rises 10 feet at the same time.

The leading mark over it, is a field in the form of a shoulder of mutton (situated just above a small wood, and exactly under the lowest dent or saddle of the inner land), just on with or a little open of Hairy point, bearing S.E. ½ E. or nearly so. As soon as Kenny's summer-house, or westrecot trees, which stands to the S.W. of the entrance, begin to shut in, you will be entering on the bar. Proceed with the leading mark on until Tapeleigh House comes in a line with the easternmost house in Appledore, bearing about S. b. E. ¾ E.; you will then quit the other and run with this mark on until a summer-house, southward of Appledore, comes on with another, bearing about S. b. W. ½ W.; and then steer with these in a line until Instow church comes on with the middle of a large field just above it, bearing about S.E. b. E.; with this latter mark you should proceed until you arrive in the Pool, north-eastward of Appledore, and there anchor with Instow quay and mill on with each other, bearing about S. ¾ E. Here the harbour divides into two branches: the easternmost runs up to Barnstaple, and the other to Bideford. Should circumstances make it necessary to anchor at the Crumbles, the mark is Northam church and a tree in one, bearing N.E.; and the best water is close to Hopper Ridge, which is steep-to and shows itself.

BARNSTAPLE BAR LIGHTS.—The corporation of Trinity-house, London, has caused to be erected two beacon towers, to serve as guides into the harbour of Appledore, by night as well as by day. One of these towers is built square, and stands upon the beach at Hairy point; the other is octagonal, and stands upon Braunton Burrows at the distance of 312 yards within the square one, and bearing from it S. 49° E. by compass. On each of these towers a powerful light is exhibited from reflectors, from half flood to half ebb, or from the time that flood tide has risen to the height of 10 feet on the bar, until the ebb has fallen again to the same depth: and in the day time a red ball is hoisted upon the outer light tower from half flood to half ebb, being the signal for vessels to enter.

N.B.—On the days of the full and the change of the moon, it is high water on the bar at 5 hours 30 minutes, subject to be sooner or later, as strong winds may blow from the W.S.W. or E.S.E.

Directions for Sailing over the Bar.

Ships, in stormy weather, with the wind on any point between N.N.W. and W.S.W. should take care to have the Lights or Towers in a line when they enter the breakers, as the flood-stream sets strong across the entrance towards N.N.E. By keeping the lights on, they will run in safety (when over the bar) to a fair berth off the Middle Ridge, which will show itself on the starboard hand; and they will probably obtain a pilot (if in the day time) before they come near the Outer Light Tower; about 250 fathoms from which, with the lights still in one, the channel becomes very narrow, by reason of the S.E. or inner point of the Middle Ridge. At this point, and being still without a pilot, the lights should be gradually opened to the right, hauling over towards the Grey Sand-hills, S., or S. b. W., with a flood-tide. Before getting the length of the Stony Beach at the southernmost point of those sandhills, which is steep-to, it may be expected some assistance will be afforded to bring the vessel into a safe berth.

In December, 1840, the Corporation of Trinity House caused two additional buoys to be placed for the guidance of vessels navigating over "Barnstaple Bar:" the outer one, a red beacon buoy, marked "Barnstaple Bar," is placed in the fair-way, on the outside of the bar, in four fathoms at low water, with the high light tower, half its apparent breadth open to the northward of the low lighthouse, S.E. ½ S.; Hartland point, W. ¾ N.; Baggy point, N.N.E. ¼ E.; and Northam Church Tower, in line with the centre of a grove of trees, S. ¼ E. The second is a red buoy, marked "Sprat Ridge," on the N.W. spit of the Sprat Sand, which dries at low water, with the high light tower N.E. ¼ N., and Northam church, S.W. ½ S.

But, if in desperate cases by night, in thick stormy weather, those who are entirely unacquainted, should, for the preservation of life, be constrained to run for the harbour, they have only to keep the lights in one, as before directed, until they approach the outer light to less than 200 fathoms distance; then opening the high light to the westward of the low light, hauling over to the southward, and passing both lights, they must act as circumstances may require for their preservation. Being now in comparatively smooth water, they will endeavour to run in as far as they can, taking care not to get on shore under the steep cliffs at the west end of the town of Appledore; because, immediately under these cliffs the shore is rocky, and many limestone heaps lie there; or they may continue their course past the Stony Beach, at Grey Sand hills, and run on shore on the mud at Skern.

Captain Denham has observed that, notwithstanding the Braunton lighthouses are so judiciously arranged as to insure the mariner a constantly adjusted line of direction that will lead him over to Barnstaple Bar in the deepest and clearest channel; yet the sudden violence of N.W. gales have so pressed vessels when hovering in the bay (but which perhaps have borrowed too closely on the bar before rounding to, to wait for the necessary rise of the tide), as to cause their driving into the outer breakers, with consequent total loss of life and property. It may, therefore, be well to know that, if any control is retained over a vessel so threatened, before finally striking, she should be urged toward the beach under Northam Burrows, as a life boat is kept in readiness on that side, which, to the great honour of the inhabitants, has already saved a number of lives.

From Barnstaple Bar to Baggy point, it is 4 miles N. b. E. ½ E., and thence to Morte point it is 3 miles N.E. ¼ E. Vessels working between Clovelly and Baggy point should not stand nearer to the bar of Barnstaple than with a small tower on the hill to the westward of Northam, kept open. The Crumbles Shoal lies on the north side without the bar, and nearly dries at low water. Between the bar and the Downend, which is a mile and a half to the southward of Baggy point, go no nearer to the shore than two-thirds of a mile.

BAGGY POINT is a bluff land. From one-half to two-thirds of a mile, directly off it, there is a very large and dangerous rock, called Baggy Leap, on which the sea breaks at half ebb. Between this rock and the shore there is a narrow passage with 7 fathoms of water in it, but it should not be attempted by those who are unacquainted.

MORTE BAY lies between Baggy point and Morte point, and affords good shelter from S. to N.E. b. N.; the anchorage is at a moderate distance from the eastern shore in about 7 fathoms water. Here you may lie out of the strength of the tide, but you must be careful that you may not be caught here with a N.W. wind. The shore is nearly all a sandy beach, towards which the water shoals gradually; but there is a rock lying close to the shore on the S.W. side.

Lundy Island and the South Side of the British Channel.

LUNDY ISLAND.—About 10 miles north, a little westerly from Hartland point, N.E. b. E. ½ E. 25 leagues from Cape Cornwall, W.N.W. ¼ W. 15½ miles from Morte point, and off the entrance of the Bristol Channel, lies the south end of Lundy island. This island extends N. b. E. and S. b. W. about 2½ miles, is about half a mile in breadth, and of considerable height; upon it are the ruins of a fort, which once commanded the landing place, and of a chapel dedicated to St. Ann. There is but one landing place on the island, which is a narrow place near its S.E. point. At the northern end is a high pyramidal rock, called the Constable; to the westward of which are the Hen and Chickens, and to the eastward of it are the Seal Rocks. The Shutter Rocks lie off the S.W. extremity; and off the S.E. point, to the southward of the landing place, is the Rat Islet. About 2⅓ miles N.E. ½ E. from the north end of the island is a small bank of 7 fathoms, with deep water all around it; this has such a sea on it when the tides are strong, as to render it dangerous to deep-laden vessels. On the S.E. side there is an indifferent roadstead, where vessels may lie in 6 or 7 fathoms water; and it is the more unsafe as the tide, during the last quarter of flood, varies to every point of the compass, so that it is very difficult to keep the anchor clear, but it now has the convenience of a mooring buoy.

On the S.W. side of the island is a lighthouse tower, which was erected under the order of the Honourable Corporation of Trinity-house, London, at the request of a numerous body of merchants, owners, and masters of ships interested in the navigation of the British Channel, and first lighted on the 21st of February, 1820.

The tower is elevated 70 feet from the ground to the floor of the lantern, and thence to the vane at the top 19 feet. It exhibits two distinct lights—an upper and lower light; the uppermost light revolves in a horizontal row, illuminating the whole circle of the horizon every 2 minutes, and is 538 feet above the mean level of the sea; the lower light, placed 70 feet below the upper, exhibits a fixed and steady light, extending, in a westerly direction, from N.N.W. to W.S.W. by compass. The upper light, from its great height, may be seen in clear weather at the distance of 29 miles. By this arrangement, all vessels entering the Bristol Channel will be enabled readily to distinguish the lights on the Island of Lundy from all others in that vicinity. The lower light (fixed) may be seen to 25 miles; and a vessel hovering under the western side of the island at night, in order to avoid the ebb, will be 23° clear of all straggling rocks so long as it is seen over the cliff.

In the roadstead above mentioned, a vessel may find shelter from the winds from N.N.W. to S.W. in the depth of 11 or 12 fathoms; the best place is about midway between the middle point of the island and the S.E. point, with the north point just shut in by the middle point. In this place you will be so sheltered by the height of the island that most of the flaws will pass over you; and the lights are not to be seen. You must be careful of a rock that lies about 25 fathoms off the middle point. There is on the N.W. side of the island, a roadstead called West Bay, where vessels may find shelter from easterly winds, at about half a mile or more to the southward of the Hen and Chickens.

The roads of Lundy present important advantages to vessels outward bound from Bristol, in case of adverse winds; and they are equally useful to homeward-bound vessels, in want of pilots or refreshments, and to such as may be unexpectedly driven into the mouth of the Channel by westerly gales.

The general anchorage is to the northward of Rat Isle. This islet appears like a low green hummock, jutting up from a gradual descent of the castle bluff, from which it is insulated a few yards only at high water. It lies at four-fifths of a mile east from the Shutter or S.W. point, off which is a detached black rock. S. b. W., about three cables' length from the east end of Rat Isle, is a sunken rock, on which, in March, 1829, the Frances Anne struck, when the spring-flood had set in about an hour.

Midway between Shutter point and the Black rock is a temporary anchorage, called the Rattles, which may be taken with easterly winds in 7 fathoms, out of the tide. From the cove a landing may be effected, but with difficulty.

Between Rat island and the landing place is Lamatry, an intermediate hummock, forming the south-eastern extremity of Lundy. In rounding this hummock it should have a berth of a quarter of a mile, in order to avoid some rocky ground of less than 3 fathoms. Rat island and Lamatry form the breakwater, which protects the anchorage from the western swell and flood-tide until the wind veers to the southward of S.W. Tibbet point, which is a mile and a half more to the northward, in some measure also affords shelter till the wind veers eastward of north. In the cliffy curve between, small fore and aft-rigged vessels may come-to with the farm-house in the valley open, and bearing west, and Rat isle south, at a quarter of a mile from the landing-place, in 7 fathoms, sand. From this spot they may clear Rat island on a sudden change of wind to the eastward, so as to gain the lee of the island to the Rattles, or to Jenny's cove, which is half-way up on the west side of the island, to the north of a reef called the Needles.

Tides about Lundy.—It is high water at Lundy on the full and change of the moon, at 5h. 15m. Ordinary springs rise 27 feet, as shown hereafter. The stream of flood divides, and branches northward and southward of the island at three miles west from the lighthouse bluff; the ebb stream likewise divides or splits at three miles east of it; but within that range the flood sets from north to south, along the west side of the island, the ebb yielding scarcely any stream there; nor till clearing the extremities of the island has it any considerable effect. On the east side of the island, the ebb or southerly stream sets from half flood till low water, producing nine hours' southern set and three hours' northern, but with a velocity of not more than a mile an hour. At, however, the range of one mile from the extremities of the island, the strength of tide is 4 or 5 knots, decreasing to 3 knots on springs, and 2 upon neaps, at an offing of 4 miles.

After once gaining a sight of this island, the approach may be known by the soundings and quality of bottom. At 15 miles without it, on the S.W., W., and N.W., there are 40 fathoms, with sandy bottom, shoaling thence to 26 fathoms, rocky bottom, at 5 miles south from the island; to 29 fathoms, gravel, at 5 miles to the S.W.; to 22 fathoms, fine sand, at 5 miles to the West; to 27 fathoms, with fine gravel, at 5 miles to the north; and to 24 fathoms, with broken shells, at five miles to the east. Thirty-five fathoms, sandy bottom, is the deepest water between Lundy and Milford, and there is less within or to the eastward of that line; so that the navigator may be assured of being without or to the westward of the Bristol Channel so long as he does not shoalen his water below 40 fathoms, allowing for a rise and fall in tide of 4 fathoms.

On approaching the island it is requisite to observe that the north end only requires a berth of three-quarters of a mile.

A stranger from the west or south-westward, if bound to Bristol, should take a pilot at Lundy; they are always on the look out upon the hill, and their boats always ready on the eastern side of the island.

MORTE POINT, already spoken of, is the south-westernmost point of the Bristol Channel; it lies nearly 3 miles N.E. ¼ E. from Baggy point, and has a ledge of rocks extending about a quarter of a mile to the westward. Near the end of this ledge is the Morte Stone, on which the sea generally breaks, excepting

about high water; be sure to give the point a good berth in passing, in order to avoid these dangers.

BULL POINT lies a mile and a quarter E. ½ N. from Morte point; the coast between forms a small bay, in the middle of which is a sunken rock, at about a cable's length from shore; this rock will be avoided by keeping the land to the eastward open to the northward of Bull point.

ILFRACOMBE is a little pier harbour, drying at low water, and even at some distance without; yet it is considered a convenient place to run into when a vessel is unable to fetch the harbour of Bideford. It lies nearly 5 miles to the eastward of Morte point, and has a lighthouse on the western side of the entrance, in which a miserable red light is kept from Michaelmas to Lady-day. At the pier head, with spring tides, there is 24 feet at high water; the harbour is easy of access at all times between half-flood and half-ebb, and boats are always ready to assist when the weather will permit. On a high point near the cove is a summer-house, and outside of the pier there is a roadstead, with good anchorage, in from 5 to 8 fathoms water; there is also a buoy off the entrance of the harbour, for the purpose of warping vessels out.

In advancing to the eastern side of the harbour's mouth, you must be cautious not to go too near the rocks stretching to a cable's length from the base of Hillsboro' Hill; on the opposite side, when entering, you almost brush the rocks; and, in fact, it is necessary to round them sharply, in order to shoot in with south-west and westerly winds, which blow directly out from the pier. The pier head leaves just a suitable opening between it and the main.

The spot for shelter, without the pier, is a sandy space between the back of the pier arm and Warphouse Point. Here, from two hours flood to four hours ebb, is a depth of 9 feet and more water, open only to the N.E., which does not bring in much sea. Here forty coasters may berth at a time on good ground of easy descent, composed of mud and sand. Along the pier side, at half flood, is a depth of 9 feet, increasing upon high water neaps to 14 feet and 11 feet within. Spring tides within the pier rise from 19 to 24 feet.

LANTERN HILL is on the western side of the entrance, and upon this hill is an old chapel, resembling a white-washed cottage, which, from Michaelmas to Lady-day, is lighted at night with candles, but without reflectors, affording a light that cannot be seen more than a mile off in clear weather, being originally intended only for the use of the herring-fishers.

Through the opening called Wildersmouth, which is just to the west of Capstone Hill, the town of Ilfracombe may be seen. The land between Leigh and Wildersmouth is very high, and called High Cross. To a stranger, from the westward, it is difficult to make out the harbour of Ilfracombe, as it does not show clearly, and care must be taken not to enter Wildersmouth—a mistake which might prove fatal. The Lantern Hill, on entering, is to be left on the west or starboard hand, and the more elevated land, called Hillsborough, on the east or larboard. The land at the back of Ilfracombe is likewise high.

Pilots may be had here to conduct vessels to King's road, or any other part of the Bristol Channel. In the winter season there are small vessels employed to the westward, on the look-out for those who may require their assistance in making and entering the harbour.

From Ilfracombe to the Foreland or Farland point, the distance is about four leagues E.S.E. ¼ E. At about 3½ miles from Ilfracombe lighthouse, and about a quarter of a mile off the land, a little to the eastward of Combe Martin Cove, lies the Copperas rock, with about 6 feet on it at low water: this will be cleared on the north side, by keeping the saddle of the Foreland in sight. The same mark clears the rocks off the east point of Combe Martin Cove. Off the west side of the Foreland point is the Sand Ridge, at a short distance from the shore, and therefore may easily be avoided; it has 6 or 7 feet water on it at low ebbs.

Eastward of Barrow Nose the coast forms Combemartin bay, within the S.E. angle of which are the fishing-boat creek and straggling village of Combemartin. There is no good ground here, but it is a convenient place for a vessel, beating to the westward, to heave-to in till the tide turns, and with the wind off shore a

vessel may anchor in 8 or 9 fathoms, immediately west of the Hangman hills, which terminate abruptly to the sea, at nearly 2 miles S.E. b. E. from the entrance of Watermouth.

The coast now assumes a mountainous appearance. The Hangman hills, a range of high land, nearly parallel with the shore, extend eastward to about 3 miles from Combermartin bay. The hill called the High Hangman, at a mile from the bay, is 1,056 feet high above low water. The Great Hangman at a mile and a half more to the east, is 1,160 feet high, within half a mile from the cliffs, of which the shore is here composed, and which are steep-to, from a depth of 5 and 6 fathoms. The Little Hangman terminates the Hangman hills on the west. It is considerably lower than the rest, but the more remarkable from its conical shape on all sides and its prominent position, standing, as it does, on the eastern arm of Combemartin bay.

Minehead, in a line with the extremity of the Foreland, leads on to the bank, and the Little Hangman in one with Hangman cliffs, bearing W. ½ N., leads a quarter of a mile to the northward of it, in 7 fathoms.

LINMOUTH BAY, west of the Foreland, affords clean anchorage in 5 fathoms, and quite out of the ebb stream, every where inside the land ridge.

From the Foreland point to Hurstone point, the distance is 8 miles S.E. b. E. ½ E. about 2½ miles to the eastward of the Foreland point is Cossacombe bay. Porlock bay lies to the westward of Hurstone point; here vessels may stop a tide, in 6, 7, or 8 fathoms, being careful to avoid a shoal which extends one-third of a mile N.N.W. from Porlock houses. There is also a shoal stretching about a quarter of a mile from the shore east of Hurstone point.

The FORELAND has been so named from its being high and bold, its summit rising to the height of 707 feet; but the shore is shoal around it, to a short distance outward, on the western side. Its extremity bears E.S.E. ½ E. 5 miles from Highveer point, and N.W. b. W. ¼ W. 9 miles from Minehead, the next bluff to the eastward. The exterior is an irregular ridge, falling abruply to the sea, and the interior has a gentle hollow or saddle, so that it makes clearly only on an eastern or western aspect. The soundings deepen to 21 fathoms, rocky bottom, at 2½ miles off, and then shoalen gradually towards the Welsh coast, nor does such deep water occur more to the eastward.

The FORELAND LEDGE, a rocky bank, extends 2 miles east and west, abreast of the Foreland, at the distance of a mile. The depth over its S.E. part is only 19 feet, but westward are 4½ fathoms. Between it and the Foreland the depth is 7 fathoms, and on the outside are from 10 to 14 fathoms.

In boisterous weather, from the westward, it will be prudent to keep farther out than the depth of 7 fathoms, until Capstone hill, near Ilfracombe, comes in sight over Rillage point, bearing W. ¾ N., for thus you will avoid the dangerous overfalls caused by the Ledge. Heavy-laden vessels should either give the Foreland a berth of 2 miles, or pass close round it, sweeping Linmouth bay, and thereby escaping a swamping sea.

The tide between Morte point and the Foreland, at a short distance from shore, and, excepting at the extreme points, makes down at half flood and up again at half ebb, but at the points above mentioned it runs to the last.

The streams of tide, at 2½ miles off the Foreland, run parallel to the coast, but in mid-channel they set fairly up and down, E.S.E. and W.N.W., according to the actual time of high and low water by the shore, at an average velocity of 4 knots on springs and 3 on neaps, always allowing half an hour for slack water. In the vicinity of the Foreland the time of high water, full and change, is 6^h 10^m, and the vertical rise 33 feet.

Three miles and a quarter S.E. b. E. from Hurlstone point is Greenalay point, and about a mile S. b. E. from it is Minehead pier, a place capable of admitting large vessels; here a pilot may be obtained for Bristol.

HURLSTONE POINT is remarkable, and well known as the craggy and western termination of the high land called the North hills, and extending thence toward Minehead about 4 miles. The coast, which is called Minehead Land, swells to the northward at the distance of a mile, forming Minehead Bluff, and

to the distance of 2 miles farther is bold-to. Here it is interrupted by the low shelving point of Greenalay, or Greenlea, the only cultivated spot in the interval between Hurlstone point and Minehead, and here begin straggling spits of rolling stones, which are uncovered at two cables out at low water, with long rocky spits, trending N.W. from Minehead, which make it dangerous, after half ebb, to pass nearer than half a mile toward the high-water mark. So long, however, as the Foreland point is kept in sight, or, in thick weather, if the vessel be kept in 10 fathoms of water, she will be clear of all danger. From Greenalay point the distance of Minehead pier, to the S.E· b. S., is rather more than a mile.

MINEHEAD.—The small but well-known pier of Minehead is the first place to the eastward of Ilfracombe that offers shelter to coasters with a wind on shore. Twenty-four miles of iron-bound coast which intervene have very few spots which are accessible even to a boat. The pier opens out directly under the eastern extremity of Minehead land, but many vessels, in attempting to gain it, have been lost in the chopping sea produced hereabout by the weather-tide. On approaching with young flood it will be requisite to keep to the westward of Greenalay till tide-time for pushing in, in order to avoid driving on the rocky shelf extending half a mile from the pier, it not being safe to bring up unless in moderate weather.

The pier consists of a single arm, curving to the east and S.S.E.; its parapet and outer extremity are kept white-washed, and its base stands exactly at half-tide mark, so that there is a certainty of finding 10 feet of water at three-quarters flood, and till first quarter ebb at the springs, with 17 feet at high water; on neap tides there are but 9 feet at high water. On full and change days, the time of high water is $6^h\ 30^m$: equinoctial springs rise 38 feet, ordinary springs 35 feet, and neaps 18 feet. An undertow prevails during strong north-westers, and at times such a powerful sea breaks over the pier as to carry the shingle with it in showers, and to occasion the decks to be abandoned, when blowing hard at the top of a spring tide. During tide-time, if any vessel is observed to be hovering, a lantern is exhibited at the pier-head.

Nearly 6 miles S.E. ¼ S. from Minehead is the small pier of Watchet, used by fishermen only.

Little Stoke point bears E. b. S., 5 miles from Watchet, and from this point a rocky spit, with a broad shallow flat, extends to the N.W. b. N., a mile and a half, having over it only 3 to 9 feet of water, and about half a mile of the inner part of the spit, generally covered with loose rolling stones, dries with spring tides.

The Kilve Patch, a shoal over which the least water is 2¾ fathoms, lies within half a mile to the north of the Stoke Spit, and in the passage between are from 4 to 6 fathoms. At a mile E.S.E. from the Kilve Patch is Stoke Patch, a shoal of 2½ fathoms; next follows the great shoal bank of Bridgewater bay, which will be best understood by reference to the charts.

BURNHAM LIGHTS.—At 10 leagues S. E. b. E. ¾ E. from the Foreland, and 21½ miles E.S.E. from Hurlstone point, are the Lighthouses of Burnham, which serve as leading marks into the Parret or Bridgewater river. Of this river the entrance is formed by the Gore Sand on the north, and an extensive flat on the south side. The first may be known by fish-stakes, which are fixed upon it. At a distance the mouth of the river may be known by the relative lowness of its land. The lighthouses stand on this low land, and bear from each other E.S.E. ¼ E., and W.N.W. ¼ W., distant 1,500 feet. Those who are bound up the river, to preserve the deepest water, are to keep the high lighthouse four times its breadth open to the south of the low lighthouse, until the Flatholm lighthouse opens to the east of Steepholm; vessels should then draw over to the E.N.E. till the high light is brought to the north of the low light three times its breadth, which mark is necessary to be kept on to clear the Stert and Lark sands. The sands at the entrance of this river so often change their position, that these directions must be used with great caution.

To mariners navigating the Bristol Channel, in the vicinity of these lights, a bearing of the upper light will be found particularly serviceable, to clear the *Culver sand and* One Fathom bank, hereafter described.

The eastern or upper light burns at an elevation of 91 feet 6 inches above the level of the sea, at high water, spring tides, and the light intermits,—its duration being 3½ minutes, during which space its brilliancy will be visible from N.W. b. W. ½ W. to W. b. N., and the period of its entire obscuration, 30 seconds.

The western or low light burns at an elevation of 23 feet above the same level, without intermission, and the brilliancy thereof is visible from N.W. b. W. ½ W. to W. b. N.

The tide at the mouth of the Parret rises 36 feet, and sometimes flows in with such impetuosity that it comes 2 fathoms deep at a time; and when it does so unawares, it frequently occasions great damage to shipping. This sudden rage of the tide, called a Bore, is frequent in the Severn, and all the rivers of the Bristol Channel.

With the Flatholm bearing N.N.E. ½ E. and open to the west of the Steepholm, you will be clear to the west of the Gore sand; and, with the lighthouses bearing as above, you will be in a line with the mouth of the river.

In thick weather, when the Flatholm cannot be seen, it may be useful to know that a tuft of trees, which seem to stand near the water, and in one with a grove on a high inland hill, bearing S.S.W., will also lead clear of the tail of the Gore sand in about three fathoms. Every precaution should be taken that a forthcoming flood may not drive you on the shoal, nor outside of it, especially during a westerly wind.

BRIDGEWATER, &c.—To a stranger, a pilot for the Parret, or Bridgewater river, is generally indispensable; but in case of emergency, or if a pilot cannot come out, which is frequently the case, you may advance with the lighthouses E.S.E. as above, but cannot proceed until after two hours flood, when you may steer directly for the lighthouses until the Flatholm be shut in with the Steepholm: now change the course to E. b. S. and E., with Burnham lighthouses a little on the starboard bow until the Flatholm lighthouse be opened to the eastward of the Steepholm; you may thence advance, by the inner edge of the Gore, about E.S.E. and S.E. and come to an anchor, if possible, at a little above the lighthouses. Here a pilot will be found.

The river Parret, says Captain Denham, winds through an extensive tract of alluvial ground scarcely raised above high water, and makes its exit between the Berrow and the Stert Flats, which extend more than 3 miles from the high water shore, and which, in some places, dry at low water to the height of 15 feet. To search, therefore, for the mouth of the river at 5 or 6 miles outside of the lighthouses would be a dangerous task, were it not for the fortunate situation of Brent Knoll, a table-topped hill of 883 feet in height, which stands at 2 miles to the eastward of the lighthouses, and, by a most fortunate coincidence, on their exact line of bearing. Brent church, which stands at the foot of the hill, is also on the same line, and though the steeple is dark in colour, it may often be seen before the lighthouses; bring, therefore, the southern and highest shoulder of the knoll on the proper bearing, E.S.E. ¼ E., and the church and the two lighthouses will gradually rise into view. As may be readily supposed, a high lone hill like Brent Knoll makes at a distance like an island, but so does Brean Down, which is 5 miles to the northward of Brent Knoll; and the only way of distinguishing them, when seen separately, is, that the summit of the knoll is nearly flat, while that of the other, and likewise of Steepholm, are hog-backed.

The GORE SAND extends about 4¼ miles from the shore, and between 2 and 3 off the mouth of the river, to which it is almost a bar; with the Flatholm bearing N.N.E. ½ E. and well open to the west of the Steepholm, you will pass clear of the west end of it, in 3 fathoms water, and with the lighthouse bearing as above, you will be in a line with the mouth of the river. A black buoy has been placed in 3 fathoms, with Worle windmill, its apparent length on the south part of Brean Down, E.N.E. ¾ E.; Burnham High Light tower, its apparent length open eastward of the Low Light tower E.S.E.; and Flatholm, its apparent width open northward of Steepholm, the Light tower upon the former island bearing N.N.E. ¾ E.

In hazy weather, when the Flatholm cannot be seen, a nearer mark is a tuft of

trees apparently near the water, in a line with a grove on a hill inland bearing S.S.W.; this will lead clear of it in the same depth of water.

The CULVER SAND is a dangerous flat, extending E. b. S. and W. b. N. about 5 miles in length, and 1 broad; it apparently dries and lies to the northward of the track to Bridgewater. Its west end bears E.S.E. ¼ E. at the distance of 20 miles from the Foreland; and when Quantock hill, which has a tower or beacon upon it, bears S. b. W., you will be abreast of that part. When Flatholm is in one with Steepholm, or bearing N. b. E. ½ E., you will be about a mile to the eastward of the east-end. In westerly gales the sea breaks on some parts of it at half ebb; the south side shoals gradually, and between it and the main, there are from 4 to 8 fathoms water. The flood tide sets with great velocity from the Ness or Nash point, directly over it into Bridgewater bay, which requires great care to guard against. East Culver buoy is red, in 6½ fathoms, with Penarth head on with Lavernock point N.N.E. ¾ E.; Blackmore point, just open southward of Steepholm, E.N.E. ¾ E.; Flatholm Light tower N.E. ½ E.; and Burnham church tower S.E. b. S.

West Culver, red and white striped, with beacon, in 4 fathoms, with Swallow cliff a little open of the south end of Steepholm E. ¼ N.; Willet's tower well open to the westward of West Cantock's wood, S.S.W. ¼ W. westerly; East Culver buoy E. ½ S.

The HOLMS are two small islands, distinguished by the name of Flatholm and Steepholm; the former, which is the northernmost, is low, and the southernmost is a high round island. The Flatholm has a lighthouse, which bears from the north end of Lundy Island E.S.E. ½ E., distant nearly 20 leagues. This lighthouse is illuminated with Argand lamps and reflectors, and exhibits a bright, fixed light, on the best principle, all round the horizon, 156 feet above high water, and visible 17 miles. Its true situation, according to the trigonometrical survey, is in latitude 51° 22′ 33″ N. and longitude 3° 7′ 3″ W. from Greenwich. On the New Patch, about half a mile E.S.E. of the Flatholm, is a white buoy, in 9 feet of water; and on the west side of the Wolves, a mile to the north-westward of the Flatholm, is a chequered red and white buoy, in 5 fathoms, at half a cable's length from the rocks; a dangerous rock has also been discovered with only 5 feet water lying on it, lying S.W. b. W. ½ W., ¾ mile from Flatholm lighthouse.

From the Flatholm the Steepholm bears about S.S.W., distant 2 miles; the depths between are from 6 to 8 fathoms, and the tides are generally very rapid. The Steepholm is bold-to, excepting at the east end; but half a mile south of the island a rocky patch of 2 fathoms has recently been discovered. The Flatholm is also bold-to within a cable and a half, excepting at the east end, which should not be approached nearer than one-third of a mile: vessels may anchor and stop a tide under this island, in the depth of 4¾ or 5 fathoms at low water, at the distance of half a mile N.E. b. E. from it; but with a fresh breeze the tide ripples and breaks much.

One Fathom Bank.—This bank is of small extent, and lies about 3½ miles to the westward of Flatholm, and 3 miles to the northward of the Culver Sand; it has, according to its denomination 6 feet on it at spring ebbs. St. Thomas's Head kept open to the northward of the Steepholm, and bearing about E. ½ S., will lead between it and the Culver Sand. A white house on the hill on the main within Barry Island, in one with the east end of that island, clears it on the west side. Portishead or Fort Point open to the southward of Flatholm, leads clear to the southward of it, and the same point open to the northward of Flatholm, leads to the northward of it. On the western edge of the One Fathom Bank, 3 miles to the northward of Culver Sand, is a black buoy in 5 fathoms.

The coast between the entrance to Bridgewater and the extremity of Bream Down, which lies to the north-eastward, is sandy, and is shoal to a considerable distance from the shore. From the extremity of Bream Down, a reef, called the How Rocks, extends about a cable's length off.

From the point of Bream Down N.E. b. E. ¾ E., distant 2 miles, lies Weston or Anchor Head; the coast between forms a bay called Uphill Bay, which is shoal, and is used by very small vessels only. From Anchor Head foul ground and rocks

extend about half a mile, among which is the Bearn Rock, or islet above water, which lies directly off the head.

ST. THOMAS'S HEAD lies about N.E. ½ E., at the distance of a mile and three-quarters from Anchors Head: between, the land forms a bight called Sand Bay, which is shoal, but may be approached safely by the lead. Here vessels may find good anchorage with easterly winds, in the depth of 5 fathoms, at about mid-way between the two heads, by shutting in the eastern land.

To the northward of St. Thomas's Head, about 2 miles, lies the west end of the English grounds, which thence extend to the eastward 6½ miles, and from the shore three miles: part of these, called the Clevedon Flats, dry at low water; and at the N.W. extremity of the English grounds there are only 3 feet water, the Clevedon Flats lying N.N.E. ¼ E., three miles from St. Thomas's Head, and E. ¾ N., six miles from the Flatholm. The channel towards King Road here becomes narrow, being bounded on the north side by the Welsh grounds, which are very extensive, rocky, and dangerous, partly drying at low water, and being steep-to. The channel between is not one mile in breadth.

A LIGHT VESSEL is situate on the south side of the channel, between the English and Welsh grounds. It lies in 5 fathoms, exhibits a brilliant light, revolving every minute, and lies 9 miles below, or to the westward of, King Road; and its marks are, the high land of Minehead on with Flatholm light tower W. b. S., the Usk light tower N. b. E. ½ E., and a remarkable peak on the distant land, (known as See-me or See-me-not) S. ¼ W.

The S.W. end of the Welsh grounds lies 7¼ miles E.N.E. ½ E. from the Flatholm lighthouse, and the grounds extend thence up the Severn beyond King Road.

Monkstone is a sunken rock, off which lies a green buoy, in 3 fathoms, half a cable's length westward of the rock, with the southern extremity of Barry Island on with the main land inside Sully island W. b. N.; Uphill church tower S. b. E., its apparent length open eastward of Bream Down; and Flatholm light tower S.W. ½ S.

From Flatholm to the N.W. elbow of the English grounds, E. b. N. 5½ miles. From Flatholm to the tail of the S.W. patch of the Welsh grounds, E.N.E. ½ E., 6 miles. N.W. elbow of the English grounds to the north elbow, E. ¾ N. two miles. N.W. elbow of the English grounds to the light vessel, E. ½ N., one mile and a third.

LIGHT VESSEL TO KING ROAD.—North elbow of the English grounds to the Pigeon house on the south shore, E.S.E. ¾ E. 5 miles. Pigeon house to Blackmore point or Blacknose, E.N.E. one mile and three-quarters. Blacknose to Portishead or Porset point, East, a mile and three-quarters. Portishead to King road, E. 2° S. two miles.

The most particular directions for proceeding from Flatholm to King road have been given by Captain Beechey in the book which accompanies the recent surveys, and they are so far illustrated by views of the sailing marks as to be essentially serviceable to the junior pilots; but, from the peculiar nature of the navigation, even these cannot enable a stranger to proceed without some risk and difficulty. The following general remarks, extracted therefrom, may, however, be acceptable.

Should a stranger, in case of emergency, be under the necessity of running up in thick weather, he must proceed very cautiously; every thing will depend on the expertness of his leadsman, and the vessel should not go too fast for quick up and down soundings. He should also minutely calculate the different periods of the tides, and have them by him in a written memorandum. With a vessel drawing 15 feet of water, the best pilot would hesitate in thick weather at low water; a stranger, therefore, should on no account attempt it until the tide has risen at least two hours, because it is absolutely necessary to get hold of the English grounds and to keep along them, which cannot be done at low water without striking.

From Flatholm the first course should be to the eastward of that recommended for clear weather, say E. ½ N., in order to pick up the English grounds, which must be done before five miles are made good for that island, and allowing for a

tide carrying the vessel 3½ or 4 miles an hour on springs. If, when reckoning the ship to be about 5 miles from Flatholm, the soundings continue deep, haul to the southward until a cast of 3 or 3½ fathoms is obtained, a sure indication of being on the edge of the English grounds. Then an E. b. N. course should be steered, yawing to the northward when the soundings are under 4 fathoms, and to the southward when above 5 fathoms. In this manner he must continue feeling his way up to the light vessel, which he can scarcely miss, but he must, on no account, continue longer than three or four casts in more than 5 fathoms of water.

On perceiving the light vessel he should close her, and steer on E. ¼ N. to pick up the North elbow of the English grounds in 3 fathoms, allowing for the rise of the tide. At the first deep cast afterward, that is of 7 or 8 fathoms, he should alter the course to E.S.E., but still feeling the edge of the English grounds occasionally in 4 or 5 fathoms, in order to be certain of being on the south-eastern side of the channel. In this cautious but simple manner he may proceed; for unless the weather should thicken to an actual fog he will be able to perceive the high land about Walton, which is bold; and from the Pigeon house to Portishead he may freely pass within a cable's length of the rocks.

Endeavouring to keep the south shore in view, and steering E.N.E. from the Pigeon house to Blacknose, and east from thence, he must contrive to see Portishead before he runs on to King road, the course to which is E. ¼ S. and distance two miles. Let him then keep as near the south shore as the soundings will allow, as it is better to run upon the mud on that side than upon the hard sands of the Welsh grounds, where the tides sweep with great rapidity: but there will be no danger of either if unremitting attention be paid to the leads, in both chains, observing that, in mid-channel are from 5 to 7 fathoms at low water up to the buoys of King road, and recollecting that, about the time of his arrival at King road it will be nearly that of high water, provided the foregoing directions have been followed as to the time of leaving Flatholm; so that, as spring tides rise 7 fathoms, the ship will be in 13 fathoms if she is in the proper channel. So soon as the buoys are seen the vessel can be safely steered to a berth; and if not seen, she should be anchored when the estimated distance, allowing for the tide, has been run.

Directions for running up by Night.

Should necessity, in a case of emergency, force a vessel to run up the channel by night, if the lights can be fairly seen there will be but little danger in so doing at half or at two hours flood. Let Flatholm light be kept W. b. S. till the floating light be seen, and when within two or three miles bring it to bear E. ¼ N. passing close on its northern side. Then steer E. ¾ N. keeping the light vessel open to the southward of Flatholm, about half a point, till Usk light bears N. b. E., or until the water deepens to 7 or 8 fathoms, and then immediately alter the course to about E.S.E., so as to bring the light vessel W. ¼ N. or W. ½ N. before the Usk light bears N. b. W. Steer toward the southern shore about E.S.E., and get close in with it, haul round Portishead closely, and steer E. ¼ S., by the lead, two miles, into King road, whence the Usk light bears N.W. ¾ W.

If, in running these courses, any doubt should arise as to the situation of the vessel, feel the edge of the English grounds and keep along them. If this should be done with an ebb tide on the eastern side of the English grounds, haul off eastward immediately on shoaling to 5 fathoms, for the bank there is steep-to, and the tide runs furiously over it. But the Usk light must not be brought to the westward of N. b. W. while the light vessel is to the westward of W. ¼ N. until the southern shore is close on board.

AVON LIGHT.—In order to facilitate the navigation into the Avon, a light-house has been erected on the eastern side of the entrance, within Dunball island, which exhibits a brilliant fixed light at an elevation of 70 feet above the level of high water, spring tides, and therefore to be seen more than three leagues off. A red light is seen from the lantern of the same tower to mark the entrance to the Swatchway.

North Side of the Bristol Channel.

RIVER USK.—The entrance of this river, leading to Newport, lies 11 miles N.E. ½ E. from Flatholm. Upon the western side of the entrance a lighthouse has been erected, which exhibits a powerful and constant light from a horizontal row of Argand lamps and reflectors, in all directions, from Penarth point to King road. A red light in this tower, 20 feet below the bright light, leads into the river on a N. b. W. ½ W. bearing, between a black and white buoy, two cables apart, at the entrance, and 1½ miles from the tower, which bears from the western or black buoy N. b. W., and from the eastern one N.N.W. Another red light is also shown up the river in a N.E. direction towards Newport, elevated 39 feet.

If bound from King road to the road of Penarth, and having reached, by the directions already given, the southwest end or tail of the Welsh grounds, stand to the northward and eastward over to the Welsh coast, and thence between this coast and Cardiff grounds into the road of Penarth or Cardiff. Approach no nearer to the Cardiff grounds, on the east, than with Worle Mill (in Somerset) on with the west point of St. Thomas's Head. The depth this way, between the coast and Cardiff ground, is only 8 or 9 feet at low water. The best way, therefore, is to proceed in from the southward, by standing toward the Flatholm until clear of the Monkstone; then haul over to the northward for Penarth road. The leading mark up to the road, as before noticed, is the Steepholm a little open to the west of the Flatholm.

CARDIFF.—The tide haven of Cardiff lies about 4 miles N. ½ E. from the Flatholm, and has without it a good roadstead, where vessels may lie securely, without almost any wind, sheltered by the banks which lie to the northward and eastward of it; of these the principal is named the Cardiff grounds, which is 2 miles in length.

Here a flat of soft mud extends from the northern shore more than a mile out, on which vessels may safely lie aground at half ebb: the nearer they lie to the land the sooner they will be left dry and the shelter will be better; but it is necessary to be cautious lest they get beneaped if close in. Penarth may be easily known by the land being high and a low church upon it.

Cardiff Hook buoy is chequered black and white, in 2 fathoms, with Cardiff church tower N.N.W. ¼ W., its apparent length open eastward of a conspicuous clump of trees; Peterstone church tower N.E. ¾ E. apparently midway between the spire of Newport new church and the tower of the old church; and the Usk light tower N.E. b. E. ¾ E.

West Cardiff, black with beacon, in 4½ fathoms, with the east end of Steepholm S. ½ W. on with the west end of Flatholm; Ball's cottage (white), open southward of Lavernock point, W. ¼ N.; and Cardiff Hook buoy E.N.E. ¼ E.

From Cardiff road the east end of Steepholm will be in a line with Flatholm, and at half tide the S.W. end of Cardiff grounds will be in a line with the two holms, bearing S. b. W. ½ W. At this state of the tide Cardiff road is only open to the S.S.W.; but at high water, or when the grounds are covered, it will be open from S.S.W. to E. Steepholm, open to the westward of Flatholm, will lead into Cardiff road to the westward of the grounds.

Vessels bound hence to Newport, by night or in thick weather, should run along shore about east or E. b. N., in 2½ or 2 fathoms, and on deepening the water to 3 or 4 fathoms they will be in Newport Channel, and should haul up N.E. or N.N.E. The lighthouse on the west side of the Usk may be seen all the way from Penarth to King road; there is also a church upon a hill which bears N.N.E. ¾ E. from the channel's mouth. Should the darkness of the night prevent you from proceeding up the river, you may anchor in safety on either side, just within the entrance, where you will ground at half ebb; but it is necessary to carry a small anchor on shore, in order to make your vessel swing clear of her anchor on the succeeding flood; by the neglect of this precaution vessels frequently break their anchors or get them through their bottoms.

Vessels bound to Newport from the southward should bring the Flatholm lighthouse to bear S.W. b. W., and steer N.E. b. E., keeping it on that bearing, and they will pass between the Welsh grounds and the coast of Monmouth, towards the lighthouse at the mouth of the river Usk. In this passage they will have from 7 to 10 feet, at low water, but there are several heaps of ballast in it. The marks to clear the west end of the Welsh grounds are, a windmill near Woodspring over a white beach at St. Thomas's head, between its eastern and western points; and a church standing on the west end of Brent knoll, in Somersetshire, in a line with Anchor head, bearing S. b. W. ½ W. At a proper time of tide small vessels frequently go over the Welsh grounds to Newport; but large vessels mostly pass to the westward of the Welsh grounds between them and the Cardiff grounds as we have described. As the tide sets very rapidly between the Monkstone and Cardiff grounds, the passage between them should be avoided if possible.

By virtue of an Act of Parliament, a port has been constructed at the sole and vast expense of the Marquis of Bute, called Bute docks, the entrance of which is so well sheltered from the raking S.W. winds by the coast between Penarth head and Lavernock or Arlope point, that the roadstead at the mouth of the Taff is as favourable an outlet for the new port as could possibly have been desired. The float is of great capacity for large shipping; so as not only to be adequate to the present trade, but to such an increase as may be expected to arise from the accommodation thus afforded.

The floating harbour already made is entered through sea gates of 45 feet width, which open into a spacious basin of about an acre and a half, and calculated for vessels of great tonnage. The main entrance lock is situate at the north end of this outer basin; it is 152 feet long by 36 wide, dimensions which were assumed for the locking of ships of 600 tons burthen. Passing this lock, the ship canal is entered: it extends in a continuous line toward the town of Cardiff, 1,400 yards in length and 200 feet wide, comprising a mile of fine wharfage, and varying in depth from 19 to 13 feet. More extensive docks are also being constructed.

The **BUTE DOCKS** are entered by a straight open channel, 1,250 yards in length, cut through the mud lands from the part of the roadstead called the Eastern Hollows, where the two outer buoys are placed, and leading up to the sea gates. The Eastern Hollows lie with Cardiff church a sail's breadth open to the westward of the glass-houses; the eastern end of the Steepholm in one with the western side of the Flatholm, and St. Bride's church just appearing to the southward of Peterstone church. The trend of this channel is N.N.E. (by compass) being led thus to be effectually sheltered by Penarth point; and throughout the whole length, as early as half tide, are from 9 to 12 feet of water, deepening at high water to 32½ feet in springs, and 22½ feet in neaps.

In addition to ten warping buoys, five on each side of the cut, there is a substantial pair of dolphins at 240 feet from the docks, and at nearly the same distance apart; so that when there is water sufficient, a vessel may, with the utmost confidence, boldly run for the dock gates in any weather, keeping the warping buoys and the dolphins on each side, in a channel 200 feet wide, using only the common precautions requisite when entering pier harbours in general.

This cut is daily improving, as the sides are made at a slope which will induce slips, and these slips are merely the ground taking a flatter and more natural inclination by the top sliding or falling inward; then, by carefully scouring off these extra deposits, the cut will be gradually widened till it assumes the form and aspect of a work of nature rather than of art. There is an embankment running down the eastern side, upwards of 400 feet, rising to 4 or 5 feet above the highest, or equinoctial, spring tides; and this will probably receive many additions. The width of the cut near the entrance has already much increased since it was begun, and will continue to widen until it becomes like the old bed of the river; a natural consequence of nearly the whole stream of the Taff being turned into it, by means of a feeder, reservoir, and sluices.

All winds from E.S.E. round southerly to N.W. (by compass) comprising no fewer than 18 points, will prove fair for entering the Bute docks; and all those

which blow from S.E. round northerly to W.N.W. are fair for leaving them. Unfavourable weather and calms will be counteracted by steam tugs; though it should be noted that the winds which create any difficulty in getting out, are exactly those which no sailor ought to be outward bound with in the Bristol Channel.

The dangers of the approaches to the Bute docks are of no moment whatever, when compared with other ports of the Severn: as they are all, with the exception of the Wolves and the One Fathom bank, either to the eastward or westward of the fair-way channel. Among the former may be enumerated the Monkstone and the Cardiff Grounds; and of the latter the Cefn-y-Wrâch and the Patch under Penarth head, and in the mouth of the Ely river. The Ranie Spit, protruding in a S.E. direction from Arlope point has been heretofore noticed; but this, too, is to the westward of the fair-way, and of great service in checking the rapidity of the tide through Penarth roads.

The ORCHARDS.—Considerably to the eastward of Penarth point, and consequently quite out of the track of vessels bound into Bute harbour from the west, are some rocky shoals called the Orchards, which lie exactly upon the low water line. Newport church within its own length of Peterstone church leads to the southward of them; and St. Bride's church in one with that of Peterstone leads between them and the land, in not less than 8 or 9 feet of water at half flood. The mud lands, from the Orchards to the Cardiff Moors, form a plain slightly inclining to seaward.

DIRECTIONS for entering the BUTE DOCKS.—If a master intends to avail himself of the excellent accommodations afforded to vessels of every class in the Bute docks, he should endeavour to get into Penarth roads about the period of half flood, so as to enter the docks upon a rising tide, as should be done at all pier harbours. Rounding Arlope point for this purpose, upon the given leading mark, Cardiff glass-houses just open to the east of Penarth point, at the distance of between half and three-quarters of a mile, but not more; by which precaution the vessel will be kept in the northern set of the tide, instead of that which inclines toward the Monkstone.

At the period of half flood a blue flag is hoisted at the dock gates: there are then 10 feet of water, at the least, on the dock-sill, and men are on the look-out to give what assistance the seamen may require. When there are 15 feet of water on the dock-sill a white flag is hoisted. Ten feet of water will be found at the sea-gates at the early period of half flood; 16 feet at four hours flood, neap tides, which is sufficient for a ship of 400 tons; and 19½ feet at high water neaps. At four hours flood, in ordinary spring tides, there will be 20 feet of water on the dock-sill, and there are 16 feet during no less than six hours and a half of each tide. When inside the float, and fasts are carried to the mooring-posts, a ship is in perfect security.

High water on the full and change of the moon at $6^h\ 37^m$; springs rise high and rapidly. At the Eastern Hollows, springs rise 32 feet 6 inches, neaps 22 feet 7 inches. Bute dock-sill springs 29 feet 5 inches, neaps 19 feet 6 inches. In Penarth roads equinoctial tides 46 feet 5 inches. Springs 39 feet 7 inches, neaps 20 feet 1 inch.

PENARTH to the MUMBLES POINT.—Orlop or Lavernock point lies about 2¼ miles S.S.W. westerly from Penarth point. There is a shelf extending above a quarter of a mile from Orlop point, which will be to the northward when Sully isle is shut in with Barry island. Between this shelf and Penarth point vessels may anchor in 2½ or 2 fathoms water.

ORLOP POINT lies 2½ miles N. b. W. ¾ W. from the Flatholm. We have before said that the north and west sides of this island are bold, nearly close to; but at about one mile and a quarter N.W. b. N. from the light, there are a cluster of dangerous rocks, called the Wolves, on which the sea generally breaks at half tide. A red and white chequered buoy is placed in 5 fathoms, half a cable's length westward of the rocks, with Hayes' windmill on with the west end of Sully island N.W. northerly; Penarth head N. b. E. ¼ E.; and Flatholm Light tower S.E. There is a passage between them and the Flatholm, but it is

dangerous to attempt it without a commanding breeze. With Cardiff Tower open of Penarth point you will be to the eastward of them. Barry island, just open of Sully island, is the leading mark between the Wolves and Orlop point. Within half a mile to the south-eastward of Lavernock point is a white buoy in 4 fathoms.

From Orlop point westward about a mile and a quarter is Sully isle, with a small shoal close to the east end. From Sully to Barry isle the bearing and distance are W.N.W. ¾ W. 2½ miles. The coast between Orlop point and Barry isle is, in general, bold to a moderate distance. Between the eastern side of Barry and the main off a spot called Redbrink there is anchorage for small vessels, some go higher up on the mud. About a mile and a quarter to the westward of Barry is Ross point, which has a church on it; nearly midway between lies the Old Chapel rock, which may be avoided by keeping Sully isle open of Barry isle.

About 4½ miles N.W. b. W. ¾ W. from Barry island lies the entrance of Aberthaw, where very small vessels may run in and lie aground on mud; the shore between is tolerably bold, with the exception of the Old Chapel rock. The western side of the entrance is formed by Breaksea point, which is long and low, and shoals off to a considerable distance; therefore, in passing, give it a berth of two thirds of a mile. Sully isle, well open of Barry, leads clear to the southward of it. On the outside of the rocks near Breaksea point, in 5 fathoms, is a beacon buoy, striped horizontally black and white.

Two miles N.W. b. W. from Breaksea point, is Coldue point; and thence four miles N.W. ¾ W. is the Ness or Nash point, which forms a bluff. St. Donnat's castle and village stands to the eastward of it on elevated land, and form distinguishing marks.

NASH LIGHTS.—The Light towers erected upon the Nash point, in the county of Glamorgan, are situated from each other S. 58° E. and N. 58° W., distant 1,000 feet; and that the lights exhibited therein are fixed or stationary; the eastern or upper light burning 167 feet, and the western or lower light 123 feet above the level of the sea at high water; the brilliancy of which, respectively, will be visible, the high light from S.E. b. S. to N.W. ½ W., and the low light from S. b. E. ½ E., to N. b. W. ½ W., but in particular states of the atmosphere, and when not distant from them, they may be seen faintly beyond those bearings. Masters of vessels and others sailing up the Bristol Channel in the fair-way, will make these lights as two separate and distinct lights, and to prevent the possibility, under peculiar circumstances, of mistaking them for those upon St. Ann's point, it may be well to observe, that in making the lights upon the Nash point from the south-westward, the high light will be seen to the right, or southward, of the low light; whereas, in making the St. Ann's Lights from the same quarter, the high light will be observable to the left, or northward of the low light. These lights in a line lead to the southward of the sands lying to the westward of the Nash point, but from the proximity of the Nash sand to that point, they must, of a consequence, carry near the south-eastern part of that sand, and at the distance of half a mile from the point, not more than a cable's length from it. Masters of vessels are therefore cautioned to keep the high light open to the southward of the low light, when approaching the Nash point; and in proceeding to the eastward, the high light upon a bearing of N.W. ½ N. will lead clear of the foul ground off Breaksea point, and between the One Fathom bank and Culver sand, until the Flatholm light is brought upon a bearing, to enable them to steer to the eastward as heretofore.

At about two cables' length N.W. b. W. from the Nash point is the east end of the Nash sand, which thence extends more than 5 miles N.W. b. W. A very heavy sea breaks on this bank, and from its east end nearly 4 miles of it dries at low water. Barry island, kept open of Breaksea point, leads clear to the southward of it; and the Worm's head, well open of Port Inon point, bearing N.W. ¾ N., clears it on the S.W. On and near the Nash sand are three buoys. That on the west end is a beacon buoy, chequered black and white, in 6 fathoms; the next is on the west side of the Nash Swashway, at 2¼ miles eastward from the former: it is black, in 2½ fathoms: the third, chequered red and white, lies

in 4½ fathoms; on the eastern end of the sand, within half a mile from Nash point. The passage between the Nash point and east end of Nash sand, has in it from 3 to 5½ fathoms at low water, but it is seldom used except in fine weather by small vessels bound to Neath, &c. But in their passage up, they must be careful to avoid the Tuskar rocks, lying S. b. W. ¾ W. Two miles from Newton a buoy has lately been placed, painted green, in 4½ fathoms, a cable's length S.W. of the rock, with Newton Down windmill N.N.E. ¼ E. on with a cluster of trees eastward of Newton Nottage church tower; a windmill on the sea shore, on with Dunraven point, S.E. b. E.; the Nash Low Light tower S.S.E. ¾ E., and go within the Scarweather shoals, in 4 or 3 fathoms water.

The SCARWEATHERS.—About 3 miles north from the west end of the Nash sands, is the S.E. end of the Scarweathers: they are irregular sands, extensive and dangerous, running about W.N.W. a distance of 6 miles, and drying in patches at low water. Their western end lies with the Mumbles lighthouse, bearing N. b. E., and Oxwith point N.N.W. ¼ W., distant 10 miles. Between these and the Nash sands there are from 6 to 10 fathoms water; between their eastern end and the shore from 4 to 2 fathoms, and between their N.W. part and the Mumbles lighthouse from 7 to 13 fathoms. The west end of these sands should be approached with great caution, particularly with westerly winds and a flood tide, as they tail off shallow to a great distance. Two buoys have lately been laid on East Scarweather, red and white striped, in 6 fathoms; with a conspicuous shaft on the summit of the highest hill, open eastward of Constantinople Cottages, the apparent length of them, N.N.E. ¾ E.; Margam Trees on with the west end of a long stone wall terminating near the beach, E. ½ N.; Nash Low Light tower S.E. ¾ S.; Mumbles Light tower N.N.W. ¼ W.

West Scarweather, red, with a beacon, in 4½ fathoms, with Constantinople Cottages on with the mouth of Aberafon harbour, E.N.E. northerly; Margam trees open southward of Skar house three times their apparent width, E. b. S.; Nash High Light tower S.E.; and Mumbles Light tower N. ¼ E.

The Scar point is known by having a large farm-house upon it: it is moderately bold to the southward, but a shelf called the Muscle bank extends nearly a mile to the N.W.

SWANSEA BAY.—Between Scar point and the Mumbles point, a distance of 10½ miles N.W. b. N., is Swansea bay, in which are the harbours of Aberafon, Neath, and Swansea. The Mumbles point (so called) is the outermost of two islets, and lies nearly a quarter of a mile to the south-eastward of the nearest point of land: they are both surrounded with water at about half-flood, and at high water vessels of considerable burthen may pass between them. This is distinguished by a lighthouse having Argand lamps and reflectors, exhibiting a brilliant fixed light 114 feet above high water, and may be seen at the distance of 5 leagues. To the eastward of it, in Swansea bay, vessels may ride in safety in 5, 4, or 3 fathoms, as convenient, sheltered from westerly, northerly and easterly winds; but it must be observed that the water is shoal a long way off, and you must, therefore, be guided by your lead and the state of the tide.

ABERAFON.—The bar of this tide-haven lies about 6 miles to the northward of the Scar point, and 6½ miles S.E. b. E. ½ E. from the Mumbles lighthouse. It is a shifting bar, and pointed out by two buoys: but strangers must take a pilot. The bank shoals nearly a mile off, and there is generally much sea on it.

NEATH HARBOUR.—The bar of this tide-haven lies about 4 miles N.W. b. N. from that of Aberafon—and about the same distance from the Mumbles lighthouse: this, like Aberafon, is fit for small vessels only; and although the passage in is properly buoyed, and beacons are placed on the northen sand to point out the channel, which is very narrow and shallow, it should not be attempted without a pilot.

SWANSEA HARBOUR is also a tide-haven: it has been greatly improved of late years, and has now a pier and a tide-light, which bears from the Mumbles light N.E. ¾ E. distant 3 miles. The bar is within the pier-heads, and as soon as there are 8 feet water on it the tide-light is exhibited on the pier-head, and continues until the water has fallen again to that depth; by day, a black ball is

hoisted for the same purpose. Within the bar the water deepens. Pilot boats are always at sea in readiness to assist vessels. Docks and other improvements are in the course of construction at Swansea.

About 2¼ miles E. b. N. from the Mumbles lighthouse, is a shoal of about a quarter of a mile in extent, called the Green Ground.

There is good anchorage in Mumbles road, in 14 or 15 feet at low spring ebbs, with the lighthouse bearing S.S.W., at about two cables' length from the opening or sound between the islet on which the lighthouse stands; and that next to the N.W. of it. Also farther to the N.W., in 12 or 13 feet, taking care to keep the Mumbles head in sight clear of the eastern extremity of the land. Small vessels and coasters which are wind-bound, or waiting for the tide to go over the bar, generally lie a-ground on fine soft mud off Oystermouth.

The MIXON is a dangerous bank of rocks and sand lying to the southward of the Mumbles lighthouse: it has 4 feet on it, and 10 fathoms close to its south side. With westerly gales a heavy sea breaks on it from half ebb to half flood; the lighthouse bearing N. ½ W. will lead clear of its east end. There is a good passage between it and the Mumbles islets. Port Einon point, just appearing open of Oxwith point, leads well to the southward of it. Cashwell bay is the first small cove to the westward of the Mumbles head. The houses in this bay, on with the western part of it, clears the west end of the Mixon. There is a white buoy in 10 fathoms, with Port Einon point, on with Oxwith point, W.N.W. westerly; Kilvey Old Mill tower, on with Swansea East Pier head. N.E. ¾ E.; Mumbles Light tower N. b. E. ½ E.

MUMBLES to CARMARTHEN BAY.—W. b. N. distant 6¼ miles from Mumbles head and 7 from the lighthouse is Oxwith point, around which the tide runs with great strength. On the east side of this point is Oxwith bay, on the west side of which vessels may anchor as near to the shore as convenient, well sheltered from northerly and westerly winds. Port Einon point is 2½ miles N.W. b. W. ¾ W. from Oxwith point, and between the two points is Port Einon bay, in which the ground is foul.

The WORM'S HEAD.—N.W. 4¾ miles from Port Einon point lies the Worm's Head, which is the west end of a narrow peninsular or island lying off Rosilly point, to which it is joined by a dangerous reef which dries about half ebb, but at high water, on spring tides, has sufficient water on it for vessels of considerable burden to pass over. The S.E. end has a gradual ascent, and forms a short space of table land of moderate elevation, whence it again falls low, and then increases in height, serrated to near the N.W. extremity, called the Worm's Head, which rises higher than any other part, in form of a hay-cock, and terminates abruptly over the sea, so that it cannot be mistaken for any other land in its vicinity. Rosilly point is also a steep cliff, and of about the same elevation as the Worm.

HELWICK SAND.—At 1 mile W. b. N. from the west end of this sand, a light vessel is placed, with the extremes of Burry Holm on with Pembrey Pier light bearing N.E. b. E., Port Einon point on with Oxwith point E. b. S. ¾ S. and Worm's head E.N.E. 3⅔ miles. This is a dangerous bank, being steep-to, on which the sea breaks with great violence in westerly gales, there being only about 5 or 6 feet water at low ebbs, on the greatest part of it, deepening to 2 and 2½ fathoms near each end. Its east end lies about half a mile to the westward of Port Einon point, whence it extends westerly and W.N.W. about 6 miles. Besides the passage between its east end and the point, it has a swashway through it, with 4 or 5 fathoms water. The Mumbles head, kept in sight without Oxwith point, bearing about E. b. S., clears its south side; and Oxwith point, shut in behind Port Einon point, clears it on the north side. The west end may be crossed in 3½ fathoms, with the Worm's head bearing N.E. b. E. ¼ E., distant 3 miles, and Port Einon point E.S.E. ½ E. At the above depth of 3½ fathoms Pembrey church and house are open to the eastward of Burry Holm, bearing N.E. ¼ E., and two houses in Rosilly bay will be seen over the sound between the Worm and Rosilly point.

On the western extremity of this sand, nearly a mile east of the light vessel is

a black beacon buoy, in 5½ fathoms; in the swashway, between the two parts of the sand, is a striped black and white buoy, in 4½ fathoms; and, on the east end of the sand is a black one, in 2½ fathoms. The latter at the distance of three quarters of a mile westward of Porth Einon or Portynon point.

East Helwick buoy black, in 2¼ fathoms, with Rosilly point open westward of Tears point, the supposed breadth of a ship, N.N.W. ¾ W.; a white building upon the high land, apparently midway between two white cottages below that building, N.N.E. ½ E.

Helwick Swashway buoy, black and white striped, in 4½ fathoms, with Burry Holms appearing in the centre of Worm's sound, bearing N.N.E. ¼ E.; and Oxwith point on with Port Einon point E.S.E. easterly.

West Helwick buoy, black, with beacon, in 5½ fathoms, with Rosilly Parsonage house on with the extreme east end of Worm's island, E. b. N. Northerly; Caldy Light tower N.W. ½ N.; and Port Einon point, E.S.E.

CAERMARTHEN BAY.—From the Worm's head to the S.E. point of Caldy Island, the bearing and distance are N.W. ¼ W., 13 miles.

ROSILLY BAY.—Two miles and two-thirds, N.E. ¼ N. from the Worm's head lies the west extremity of Burry Holm: between is Rosilly bay, in which the water is very shallow from the Holm to a full mile to the southward of it. Farther southward the water shoals gradually, so that the shore may be approached by the lead. The greatest depth is found in the south part of the bay near the Worm; and the best anchorage there is about one-third of a mile E.N.E. or N.E. b. E. from the Worm's head, with Rosilly church bearing about S.E. b. E. With these bearings there are from 5 to 6 fathoms at low water spring tides, and vessels may be tolerably sheltered from E. to W.S.W., or S.W. b. S., but exposed to all other winds; and those from the westward blowing hard, send in a very heavy ground sea. Therefore, this bay is but little frequented, excepting for the purpose of stopping during an ebb, and waiting until the flood tide is sufficiently risen to go over the Bars of Burry, Kidwelly, or Caermarthen, when the wind blows from any of the above-mentioned sheltered points; but with winds farther westward, and in the winter season, Caldy and Tenby roads are more eligible places, those are generally resorted to by vessels trading over these bars, and where pilots may be obtained for either of them.

BURRY RIVER.—The entrance of it is to the northward of the Burry Holm, and has a bar extending across it, consisting of various sand banks, some of which fall dry 1½ or 2 hours before low water at spring tides; these banks have channels between them, but the principal one is to the southward, near the Burry Holm and Tulk cliffs. It is necessary here to notice, that as these banks sometimes change their position, it is not considered proper for a stranger to attempt an entrance, until three-fourths of the flood are run; when, if the sea be tolerably smooth, he may sail over all of them. A lighthouse on piles is erected on the north end of Whiteford sands, where formerly a beacon stood, and the Channels are regularly buoyed, there is a considerable trade carried on at Pembrey, at which place a pier has been run out, and an excellent harbour formed for the accommodation of shipping. Stone, coal, and culm collieries have been opened, and iron works erected, so that Pembrey is now a place greatly resorted to for these articles. On the pier-head stands a lighthouse, in which a light is exhibited: this light is blue to the westward, and red towards Llanelly, and is shown when 11 feet over the highest sand at the entrance of the bay. A red flag, with a white ball, denotes the same by day. A black ball is also hoisted at the yard-arm, under the flag, when there is water sufficient for a vessel to enter the river by sailing over the banks. The lighthouse on the pier-head is 4⅓ miles N.E. ¾ E. from the extremity of Burry Holm.

In the South Channel the Pilot ship is moored in 3 fathoms water at ordinary spring ebbs, nine-tenths of a mile E.N.E. ¼ E. from the west extremity of Burry Holm, and 400 fathoms from the nearest part of the Tulk cliffs, on the south shore. On the same line of bearing from Burry Holm, and at 400 fathoms from the Pilot ship lies the Lynch buoy; above that, at about a mile distant on the same bearing, is the second buoy; these two buoys are black. Whiteford light is

bright and fixed, it stands near the north extremity of Whiteford Sker, at the distance of 625 fathoms north, from the north extremity of Whiteford point, and nearly S.S.W. ¼ W. 1,280 fathoms from Pembrey Pier head. The next in order is the first buoy of the North Channel, a black can buoy, lying on the south side of the North pool.

Those bound into Burry river should first make the Worm's head, which may be approached, if necessary, to a cable's length or less; and then, in proceeding for the bar, if near low water, should pass nearly a mile to the westward of the holm: this may be done by bringing the Worm's head to bear S. b. W., but not more westerly. When the east end of the Tulk cliffs bears S.E. b. E. ¼ E. some farm-houses will appear just over their extremity; then steer E.S.E. for Preston or Hill's Tor, and it will take you over the bar in 9 feet, which is the deepest water, and up to the Pilot Ship, or you may pass within 3 cables' length to the northward of the cliffs. The Pilot Ship may be passed on either side, but more conveniently on the south, on account of some shoal water lying about a cable's length E.N.E. from it. Having passed on the south side of it, the course to the Linch buoy will be N.E. b. E. ¼ E., and the distance half a mile. To the north-eastward of this buoy vessels generally bring up in Linch pool, in 3 or 3½ fathoms at low water, on good holding ground; and here they must wait the flowing of the tide for water to pass the Pile lighthouse, or through either of the other channels between the banks.

Vessels frequently anchor near the Pilot Ship, either to the eastward or westward of it for the same purpose.

When the tide has risen sufficiently, those in the Linch pool should weigh, and steer about N.E. b. E., giving the lighthouse a berth of 70 or 80 fathoms: then, if bound to Pembrey Harbour, so soon as Pembrey house comes on with the Old lighthouse, bearing N. b. E. ¼ E., take it as a mark to run across by; but, if bound to Llanelly, continue steering as before, until a large white chapel or meeting-house, situated apparently a little to the northward of Llanelly church, comes on with the second buoy of the North Channel, bearing E. ¼ S.; then proceed in that direction through the North Swatchway, and pass to the southward of the buoy; now steer S.E. ½ E. for the third buoy, and pass to the southward of it also. The course will then be E., E. b. S., E.S.E., along by the brush-poles on the edge of the Cefn Patrick sand, up to the Barrel-post of Llanelly, which you pass on the port hand, and haul short round the buoy to the eastward of it, into Llanelly harbour.

Pwll Quay is a stone jetty, having a small pile of engine-houses on its inner end, that are erected on the shaft of a colliery which once shipped its produce here, but is now almost inaccessible, even for boats, owing to the increased deposit of sand on the Cefn Patrick sand, which outlays the quay to the low water course of the river 2 miles. The high water shore trends from Pwll Quay for Llanelly church; and is bounded by a low railroad that conveys the produce of Pwll Quay colliery to Llanelly pier: it is edged with shingle and an outlay of rotten sward, for 1¼ mile from Pwll Quay; half a mile within is flat, but some well wooded heights rise immediately over a light-coloured mansion called Strady; these shores stop at a bight half a mile short of Llanelly church, where a bridge and pile of engine houses are situated: the same description of low shores then trend S. half a mile to the docks. Llanelly church is a square-towered, stone-coloured building, standing on a flat, backed by high land half a mile within, in the centre of a straggling town, surrounded by stacks of engine-house chimneys and smoke: it bears from Pembrey church S. E. b. E. ¼ E., 4¼ miles: half a mile S.W. b. W. of it are the lower docks, and three quarters of a mile S.S.W. ¾ W. of it are the upper docks of the port of Llanelly, where vast quantities of coal are shipped.

There is 6 feet water on Burry bar at low spring ebbs; ordinary spring tides rise about 30 feet perpendicular, and ordinary neap tides about 12 or 14 feet. It is high water on full and change days of the moon, about 6 o'clock. Pilots are always ready, except in very bad weather, without the bar, in Rosilly *bay, &c.*

The N.E. part of Caermarthen bay has an extensive flat, running off from the shore, through which is the channel to Caermarthen. It is very narrow, and has about 14 feet water over the bar at half flood. The entrance bears about east from Caldy island, whence its direction lies about N. ½ E.: it is regularly buoyed, but should never be attempted without a pilot.

CALDY ISLAND is about a mile and a quarter long, and three quarters of a mile broad; is cliffy and bold-to on the east, south, and west sides. It is distinguished by a house with two chimneys near its S.E. point, and also by its relative position with Giltar point. A lighthouse is erected on Caldy island, having a fixed light, from Argand lamps and parebolic reflectors; in passing up or down the Bristol Channel, observe that when the light bears N.E. b. N. to N. b. W. the colour will be red, to prevent its being mistaken for any other light. From the north side of the island there are two ridges of rocks, extending N.N. eastward, to the distance of a quarter of a mile, with only 8 or 9 feet water on them; and off the N.W. end of the island is an islet called St. Margaret's isle, which forms with Giltar point to the northward of it, the channel or passage called Caldy sound.

About one mile and a quarter S.S. eastward from the S.E. point of Caldy, there is an extensive patch of rough rocky ground, called the Drift rock, with 4 fathoms on it at spring ebbs, and 12, 10, and 9 fathoms close to its west side: this causes a rough breaking sea on it with westerly gales and strong tides: otherwise it is not dangerous. It may be easily avoided, either by passing within a mile of that part of Caldy, or at 2 miles from it. At nearly half a mile south-eastward from Small Ord point, in Caldy, there is another patch of a similar description with 9 feet on it, called the Spaniel: on this the sea also breaks with strong tides and tempestuous weather, between it and the point are two other patches of 2 and 3 fathoms. There are 6 fathoms between it and the point; and it may be avoided by passing at about half a mile from Small Ord point, or at a mile and a half from it. One mile and a quarter S.W. from the lighthouse is a shoal of 4 fathoms, and a mile and a third W. ½ S. from it is another shoal of 3¾ fathoms.

CALDY ROADS.—The outer road of Caldy lies off the N.E. point of the island, where ships may anchor in 4 or 5 fathoms water, with the spire which stands near the middle of the island, bearing S.W. b. W., or more westerly, and the east point of the island S.W. b. S., about three-quarters of a mile distant: the spire will then appear over the high cliffs. From the N.E. point of Caldy, which is the high cliff, a rocky ledge runs north-eastward about three-quarters of a mile, with from 9 to 12 feet water over it; to the westward of this ledge is the Inner Road, where vessels may ride, securely sheltered from all but easterly winds, in 3¾ fathoms at low spring ebbs, on good holding ground. Here the anchoring marks are, the house which is near the S.E. part of the island, on which the body of an old windmill, standing near a cliffy point next to the westward of high cliff, bearing S. ¼ W.; or the spire on with the old windmill, bearing S. b. W. ¼ W., and the N.W. part of St. Margaret's isle a sail's breadth open of Old Castle point, bearing W.N.W. ¼ W.

St. MARGARET'S ISLE is joined to the N.W. point of Caldy by a ledge of rocks, mostly above water; and as before said, forms the south side, and Giltar point the north side of Caldy sound: it is more than half a mile in breadth, and has 5, 6, and 7 fathoms water in it. At about half a mile to the westward of St. Margaret's isle are two blind rocks, with 1¾ and 2½ fathoms, and 7 fathoms close to them: their situation is distinguishable by the sea breaking on them in blowing weather. The long mark for them is High Cliff in Caldy, in a line with the N.W. part of St. Margaret's island, bearing S.E. b. E. ¼ E.; they may be easily avoided by crossing that mark-line either nearer to, or farther off from the island; another rock of 9 feet water lies in the same direction from St. Margaret's island at about a quarter of a mile distant.

From the cliffy point near the N.W. end of Caldy, called Eel point, a ledge of rocks extends N.N. eastward to about half way across the east entrance of Caldy sound, and has from 6 to 10 feet water over it: the mark for its north extremity is St. Gowen's point, touching the west part of St. Margaret's isle; therefore, St. Gowen's point open will clear it. A nearer mark, and that generally used,

is a remarkable spot on the sand-hills in Lidstep bay, just opening and shutting with Proud Giltar point, bearing N.W. b. W. ¼ W. These marks and bearings must be attended to at low water; but at half flood ships may go over all the dangers.

The WHITEBACK SAND is a shoal with no more than 3 feet water on some parts of it: it extends from near Giltar point, eastward, to abreast of High Cliff, in Caldy, whence it bends round to N.E. and more northerly towards Tenby.

The WOOL-HOUSE, or WOLLOX ROCKS, are about a cable's length N.N.E. and S.S.W., and from 15 to 20 fathoms in breadth; they have 2 fathoms very near them all round, and are covered at about one-third of flood. A red beacon with staff and ball is placed on them. They lie about 1⅓ mile N.E. ¼ N. from the east end of Caldy, S.S.E. ⅓ E. from Tenby church spire, and E. ¾ S. from Giltar point. A windmill, in one with the ropemaker's house, near the edge of the cliff to the southwestward of Tenby, bearing N.W. a little northerly, is a mark for the south end of them. Between these rocks and the Whiteback sand there is a depth of 4 and 5 fathoms.

Between Tenby and Monkstone head, at about two-thirds of a mile from Tenby pier, is a ravine; and at a short distance from the sea shore, within the cliffs, is a white house, called Waterwinch. This house, kept in sight, open of the S.W. cliff, leads without the Wool-house rocks.

YOWAN'S ROCK.—At about a mile to the east and E.S.E. of the Wool-house rocks lies an extensive patch of foul ground, with 2½ and 3 fathoms water over it, called Yowan's rock. In heavy gales of wind from the S.W. quarter, and near low water, the sea breaks violently over it, but otherwise it is not dangerous.

Vessels bound to Tenby, from the eastward of Caldy island, may pass on either side of the Wool-house rocks, thus:—To go to the westward of them, bring and keep the east point of Caldy S.S.W. ½ W.; and to go to the eastward of them keep the same point of Caldy to the westward of S.W. ¾ W., until you open the white sand and shells, or the beach between the Castle and St. Catherine's isle; you should then haul in for the Road and anchor in 3 or 4 fathoms, with Eel point in Caldy, touching the east side of St. Catherine's isle, and Tenby church spire on with the Bathing-house, or a little open to the northward of it. There are 6, 7, and 8 fathoms water on clean ground both to the eastward and northward of the Wool-house rocks, to a short distance, but farther off there is a less depth.

The TIDES.—The stream of tide makes westward through Caldy sound, nearly two hours before the flood-stream has done running without the island: and it makes eastward through the Sound, and also between the Helwick sand and Worm's head, nearly 2 hours before the Channel-ebb has done running.

St. GOWEN'S HEAD is the southernmost point of Wales, and lies 3 leagues W.N.W. ½ W. from Caldy island; the coast between is generally bold close-to, and the cliffs are mostly perpendicular. Old Castle head is about 2½ miles to the westward of St. Margaret's isle, and a little to the eastward of it small vessels anchor, to load with limestone. At 1¾ miles N.W. from St. Gowen's head is Saddle head, and about 4 miles farther, in the same direction, is Lenny head; the coast between is all perpendicular cliffs. To the southward of Lenny head are the Crow rocks, three in number. The Middle Crow lies nearly S. ¾ W. a little from that head land, and is covered at about 4 hours' flood. The East Crow Toe is visible at low spring tides, and is distant from the Middle Crow three-quarters of a mile S.E.; and the West Crow Toe, also uncovered at low spring tides, lies N.N.W. ½ W. from the Middle Crow, distant one-third of a mile, and S.S.W. ½ W. from Lenny head: these lie directly in the trade-way, and are very dangerous. The east end of Skomar island kept a sail's breadth open of St. Ann's point, on the west side of the entrance to Milford Haven, leads clear to the westward of the whole: the two Lighthouses on St. Ann's point, in a line bearing N. b. W. ½ W., clears them also. There is a good passage within the Crow rocks, by keeping near the coast; but unless the weather be fine, and the water smooth, it should never be attempted.

Between Lenny head and the entrance of Milford Haven is Fresh Water bay,

the ground of which is foul and not fit for anchorage: the flood-tide sets into it, and there is generally a heavy swell from the westward.

The PORGUS BANK.—About 1 mile W.N.W. from Lenny head lies the east end of Porgus or Turbot bank, stretching thence in a N.W. ½ W. direction, about 2¾ miles; its shoalest part has 34 feet on it, and is only 1 mile in extent: the marks being the middle Crow rock, a little within Saddle head; Warren steeple on with the north side of Blackpole point,; Sheep island N.E. ½ N., distant 2 miles; the outer end of Rat island on with a white patch in St. Ishmael's cliff; and Moorhouse over the middle of Monkhaven.

The marks for the inner end of the shoal are, the Middle Crow rock, half way between Saddle head and Flimstone head; Lenny head, E.S.E., distant 1 mile; Dale point just shut in with Sheep island; and St. Ann's lighthouses in one bearing N. b. W. ½ W.

The marks for its outer end are, the Saddle head, half way between the Middle Crow rock and Flimstone head; Warren's steeple on with the north side of Blackpole point; and Haskard House, a little without Rat island. The shoal part of the bank, as beforesaid, is only 1 mile in length, and close to both ends there are 7 fathoms each way.

Directions for Sailing up the Bristol Channel.

Vessels entering the Bristol Channel from the westward, may pass either to the northward or southward of Lundy island, as most convenient; and having passed that island, it will be found most advantageous to keep towards the south shore; as they will thereby avoid encountering any of those shoals which lie scattered along by the Welsh coast, as before described.

The bearing and distance from the north end of Lundy island to Flatholm lighthouse are, as beforesaid, E.S.E. ½ E., 20 leagues.

Those sailing to the northward of the island should pass it at a distance not exceeding 3 leagues; they will then, if by day, be clearly in view of the island; and if by night, may readily perceive its lighthouse. In the fair-way will be found 33, 26, 20, 17, 15, and 11 fathoms, the depths decreasing as you advance easterly; and as you proceed upwards from Lundy island, the land on both sides will be seen distinctly. Should you fall in to the southward of Lundy island, you must be careful, especially with a northerly wind, that you be not driven into Barnstaple bay. If the wind will permit, the best course will be to steer in mid-channel between Lundy island and Hartland point, giving Baggy and Morte points a good berth; you may then run along by the English shore, at about a mile from the land, free from danger, until you get abreast of the Culver sand, which you must pass to the northward of, and at a convenient distance, as the flood tide sets strong across it, into Bridgewater bay. This may easily be done by keeping the land to the westward well open of the Foreland; but care must be taken to avoid the One Fathom bank, which lies about 4 miles to the westward of Flatholm; therefore, as soon as you are within 5 or 4½ miles of that island, bring Potishead point open to the southward of it, and it will clear that bank. Flatholm light may be seen by night some distance to the westward of the Culver sand. In passing Flatholm, avoid the shoal lying nearly a mile to the S.W.-ward of the lighthouse: having passed it, steer more to the northward, until the high land of Minehead comes on the middle of that island, and proceed in that direction until you are about 4 miles beyond it; you will then be to the northward of the English Grounds, and Potishead point on with, or a little open to the northward of, Blackmore head, will lead you up clear of that danger: your course will be about E. b. S., but you must also be careful to avoid the Welsh Grounds, which lie on your port side, and are steep close-to. Your soundings from Flatholm in the fair channel to Potishead point, will be 9, 13, 9, 5, 6, and 7 fathoms, or more, according to the time of tides; the latter depth will be found not far from the point. The anchoring mark off Potishead is, a little

white house on the cliff near the fort in a line with the flagstaff of the fort: the ground from Portishead to the river Avon is foul, but vessels may anchor off the entrance of the river, in 6 fathoms at low water, on clay.

Moderate-sized vessels may venture across the English Grounds, at half flood, for spring tides generally rise 7½ or 8 fathoms; but the Welsh Grounds should be carefully avoided: they are steep-to, all their length.

Pilots may be obtained either at Lundy island or Flatholm.

Vessels sailing up the Bristol Channel by night should keep along by the English coast, from Lundy to Hurstone point, in 13 to 15 fathoms water, and then haul over for Flatholm, but, as before observed, be particularly careful to allow for the operation of the flood tide; but, if the weather be hazy when you are abreast of Hurstone point, it will be better to cross over to the coast of Wales, between the Nash point and Sully island, as the shore is moderately bold. Here you may run along shore, and consequently pass to the northward of the One Fathom bank, which having done, steer out between it and the Flatholm, and proceed as before directed.

But, if bound to Cardiff road, you may round the Isle of Sully and Orlop point, at about half a mile distance, to avoid the Wolves, and then haul up to the northward for the Road.

Milford Haven.

MILFORD HAVEN is generally considered as the most capacious and the most secure harbour in the British Islands. It may be entered without a pilot, either by night or by day (by taking the tide), even with contrary winds. Those who run in without anchor or cable, may run on shore on soft oaze, and lie safely.

The coast, at the entrance, is about the height of the land near Plymouth: and, on St. Ann's point, upon the west side, stand two lighthouses, hereafter described. This point bears N.E. ½ N., at the distance of 33 leagues from Cape Cornwall; N. ½ W. 15⅔ leagues from Hartland point, and N. ½ W. nearly 12 leagues from the north end of Lundy island.

The entrance is rather more than 1¼ mile wide in the narrowest part, and the depth of water is from 8 to 12 fathoms. Two little islands lie near the shore on the east side, of which the outer one, and largest, called Sheep island, lies 1¾ miles S.E. ⅕ E. from St. Ann's point; and the inner one, or Rat island is nearly half a mile to the N.N.E. of the former; two-thirds of a mile from Rat island on the eastern shore is Thorn island, on which is a battery, and at nearly 1¼ miles E. b. N. from Thorn island is Stack rock, also having a battery erected on it; these islands have rocky ledges extending off them.

The dangers at the entrance are;—the Middle Channel rock, with 18 feet depth, lying three-quarters of a mile from St. Ann's point, with St. Ann's upper light a little open to the west of the lower light, bearing N. b. W. ¾ W., on which a black buoy is placed; the Sheep rock having a depth of 3½ fathoms bearing west from Sheep island about half a mile distant; Chapel rock extending a quarter of a mile N.N.E. and S.S.W. with not more than 2 fathoms in some places, the centre bears from East Blockhouse point W. b. N., at rather more than half a mile distant; Harbour rock, with only 6 feet water on it, at the distance of nearly one-third of a mile W.N.W. from Thorn island, besides these dangers there is rocky, uneven ground of 3 to 5 fathoms depth, stretching about half a mile in a south westerly direction from St. Ann's point, likewise the space between Middle Channel rock and Chapel rock, contains many rocky spots of 4½ and 5 fathoms.

The course for the largest ships to enter in the deepest water, is to bring Stack rock fort just open north of Thorn island, bearing E. ¾ N., run in with that mark on until Great Castle head bears N.E. b. E. ½ E., which will lead between the rocks lying off St. Ann's point and Middle Channel rock, make towards Great Castle head upon the above bearing until you see Weare point come in a line

with Hobbs point flagstaff bearing S.E. b. E. ¾ E., this mark kept on will carry you to the upper part of the Haven.

On the port side within, to the eastward of Dale castle, is Dale road, where you may lie land-locked from all but easterly winds, in 2 fathoms at low water, with Sheep island on with Dale point. Large ships should lie farther out, at about a cable and a half N.N.E. ¼ E. from Dale point, in 3 to 4 fathoms water. Be cautious of not mistaking a bay to the southward of Dale point for Dale road, as it is dangerous.

ANGLE BAY is a large mile S.S.E. from the Stack rock, in which the ground is clear and good; and in case of loss of anchor and cables, ships may safely run a-ground on soft oaze, by keeping near mid-channel between Angle and Sawdern points.

HUBBERSTONE, or MAN-OF WAR'S ROAD, is the usual and most convenient anchorage for large ships: It is about 4 miles to the E.S.E. of Dale point. In sailing for it, keep in mid-channel until the town of Milford bears N.E. b. E., when you may anchor in 10 or 11 fathoms water. In working up to this place, be careful to avoid a flat shelf, which extends nearly a cable's length from the north shore, between South Hook point and Hubberstone point; and also that which stretches off from the south shore, from Popton point to Pennermouth, and thence to Pater church point. To avoid these shelfs, on either side, stand no nearer to the shore than 1½ cable's length. The Stack kept a little to the southward of Dale valley, will lead clear to the northward of the shelf on the south side.

WEARE LEDGE extends about a cable's length to the southward from Weare point, and has a nun-buoy upon it. The Stack on with, or a little to the northward of, Dale valley, will lead to the southward of it.

CARR ROCKS.—These rocks lie about N. ½ W. nearly a quarter of a mile from the turret or watch-house on Pater church point battery: they dry at 4 hours' ebb. To avoid them, and a shoal of 9 feet, which lies to the northward of them, keep Weare point just to the southward of the bluff head at Bullwell. The thwart-mark for these rocks is the west end of the battery in a line with the east end of Pater church: a beacon and white buoy is placed upon their extremity.

About a quarter of a mile east of the Carr rocks is a sand-bank, about 1½ cables in length, with 9 feet on it at low water, and is distinguished by several buoys. This will be avoided by keeping Weare point on with the buoy of the Carr rocks. When you have passed this shoal, you may haul in for the dock-yard, at Pater church, which is only at a short distance within the point. There is good anchorage off the Dock-yard in 6 or 7 fathoms; but from the southeast part of it, to the point opposite Neyland, is a bed of soft mud, which should be approached with caution.

NEYLAND ROAD lies within these shoals, at about 8½ miles from St. Ann's point; the best anchorage for large ships is with Weare point, about a sail's breadth open of Neyland point, and Barnlake N. ½ W. in 8 fathoms, on muddy ground. Between this and the shore of Barnlake there is some foul ground, extending half a cable's length from the shore, which must be avoided. There is sufficient water for the largest ships to go 4 or 5 miles above Neyland, and the anchorage good most of the way. Small vessels, with spring tides, may go up to the town of Haverfordwest. A floating stage or pier has been projected by the railway company at Neyland point, at which vessels of the largest size may moor along-side.

ST. ANN'S LIGHTS.—The present lighthouses on St. Ann's head were first lighted in June 1800. The lights are on the improved principle, with Argand lamps and reflectors. The low lighthouse, which is situated on the extremity of the head, is 32 feet high, has its lantern 160 feet above the level of the sea, and exhibits a strong continued light from the island Skomar northward round to seaward, and up the harbour as far as Hubberstone.

The high lighthouse is 71 feet high: the light is elevated 192 feet above the level of the sea, and bears from the low light N. 45° W. by the true meridian, or

N. b. W. ½ W. by compass, and is distant from the low light 203 yards. No light is exhibited up the harbour from this lighthouse, but it appears equally as strong as the low light from the island of Skomar to Lenny head.

When the lights are in one, or when the lower light is directly under the upper one, this line of direction will lead about one third of a mile without the Crow rock, and thereby ships may round Lenny head in safety, provided the low light be not brought to the westward of the high light, which, in working off that point, must be attended to.

The PORGUS BANK has already been described.

To the N.N.W. of St. Ann's Point lie the islands of Skokam and Skomar, with a multitude of rocks, which render the navigation thence to St. David's Head very dangerous.

SKOKAM is a small rocky island, lying 4 miles N.W. ¼ N. from St. Ann's Point.

SKOMAR is also a rocky island, about three times the size of Skokam, lying 1½ miles N. b. E. from it, and about half a mile to the westward of St. Bride's Head, which lies 4¾ miles N. b. W. ½ W. from St. Ann's point. Between these islands, and between them and the main, there are several sunken rocks, and, although there is plenty of water, no one should attempt these channels without being well acquainted with the dangers.

GRASHOLM is a high, steep, round rock, lying 6 miles W.N.W. from Skomar: it is the first land seen coming from the westward towards Milford Haven. About 2 leagues W.N.W. from Grasholm are the rocks called the Smalls, on one of which is a lighthouse.

The SMALLS LIGHTHOUSE is erected upon the main rock of the Smalls, which is about 50 yards in length S.E. and N.W. To the S. E. of this are four smaller ones, that appear before low water, extending in a line about 100 fathoms, and a sunken rock still further: there is a depth of 30 or 40 fathoms close to them.

The lighthouse bears from St. Ann's point N.W. b. W. about 18½ miles, and from Cape Cornwall N.N.E. ½ E. 33 leagues. It shows a fixed bright light, visible 13 miles.

The HATS and BARRELS are two ledges of rocks lying between the Grasholm and the Smalls. Part of the Barrel uncovers at half ebb, and bears from the Smalls Lighthouse S.E. b. E. nearly 4 miles. The tide runs over them with great rapidity, occasioning great overfalls and dangerous whirls to the southward. The greatest care and attention is necessary to keep clear of them, particularly with light winds, at night or in hazy weather.

RAMSEY ISLAND is about 1¾ miles in length, and lies N. b. E. about 6½ miles from Skomar, and about one-third of a mile to the westward of Penmanmillan point.

ST. BRIDE'S BAY lies between Ramsey Island and Skomar, and runs in to the eastward nearly 8 miles: there is good anchorage in it with the wind from N. E. to S., in from 7 to 9 fathoms water.

In the S. E. corner of the bay, is Goldtop Road or Little Haven, where vessels drawing 14 or 15 feet of water may ride safely from the winds as far to the westward as W. S. W. in 3 or 4 fathoms water, on sandy ground, with Goldtop or Burrow Head bearing W. ½ S., distant a quarter of a mile. There is a current on this side of the bay, which sets with the ebb to the westward for 9 hours, and turns about 2 hours before high water.

SOLVACH CREEK is on the north side of the bay, where vessels of 10 or 12 feet draught may lie aground near the quay, or ride in the mouth of the creek in 3 fathoms water; but when the wind blows from between the south and west, a heavy sea sets in, which makes it necessary to keep on the east side of the rocks, called the Scrabs or Scars, when going in. These rocks lie in detached patches: and the outer extremity, which is uncovered at low water, lies 1½ miles S.W. b. W. ½ W. from the entrance.

The entrance of the Creek is only 2 cables' length wide: the highest part of the rocks, called the Skars and Scrabs, lead to it. About half a cable's length from

the shore, on each side, there is a small rock always above water; between that on the east side and the shore, it dries at low water. To go in, leave the westernmost rock on the starboard side, and keep a little nearer to the shore than to the rock: in the channel there are 3 fathoms water. The channel between the two rocks is a little nearer to the westernmost, with 2 fathoms water in it.

RAMSEY SOUND is between Ramsey Island and the main, through which small vessels may pass in safety; there are in it from 10 to 14 fathoms water, but the stream is irregular, and runs through it with great rapidity, the stream setting northward from half flood until half ebb on the shore, on spring tides, at the rate of 6 knots. It has also several dangers in it, exclusive of the Bitches and Whelps, a ridge above water, extending from the shore of Ramsey more than half way down from the northward. The Horse-shoe Rock lies about 1½ cable's length southward from Penmanmillan point, and dries at half ebb. The Great Horse-Rock lies about half a mile N. b. E. ½ E. from Penmanmillan point, and dries with spring tides only; and a quarter of a mile beyond it, in the same direction, lies the Little Horse Rock, with 2½ fathoms on them at low water. To clear them, keep the west part of Skomar Island open of Penmanmillan point. Vessels may, however, stop a tide here, at about a cable's length from the shore, and about one-third of a mile to the northward of the Bitches and Whelps, in 7 fathoms, on sandy ground; in other parts the bottom is foul and rocky, and even here ships should make no unnecessary stay, as the eddies of the tides are very irregular.

BISHOP and CLERKS.—These are four remarkable rocks to the westward of Ramsey island, always above water. About half way between the middle of these rocks and Ramsey are three other rocks that dry before low water; and two others, lying about three-quarters of a mile S.E. b. E. ½ E. from the North bishop, which dry about half ebb. Therefore, in sailing through between these rocks and Ramsey, pass within half a mile of Ramsey to avoid the first three rocks, and within one mile of St. David's head to avoid the other two.

The lighthouse on the southern rock of the Bishops was completed in January, 1839. The light, which revolves, and appears full in all directions at short and regular intervals, may be seen between four and five leagues off.

The BASS BANK, which lies nearly in the direction of the coast, at the distance of 2½ miles from St. David's head, is, in length, from 11 fathoms at the S.W. end, to 20 fathoms at the N.E. end, nearly 6 miles. Its shoalest part, on which there are 3 fathoms, lies one mile from the S.W. end, with St. David's head bearing S. ½ E., distant 2¾ miles; and the thwart mark for it is Trelethan house, in Whissand bay, in a line with the extremity of St. David's head. On this part of the bank the sea breaks heavily, and the tides run very strongly, nearly in the direction of the bank. From the depth of 8 fathoms near the S.W. end, the west end of Skomar may be seen through the middle of Ramsey sound. To sail out or in, between this bank and the North bishop, keep within a mile of the Bishop, or keep St. David's head, bearing S.E.

From St. David's head, on the coast of Wales, to Carnsore point, the southeast extremity of Ireland, the bearing and distance are N.W. ½ N. 39 miles.

Tides between Hartland Point and St. David's Head.

On the full and change days of the moon it is high water on Barnstaple bar at $5^h\ 30^m$; at Lundy island, $5^h\ 15^m$; at Ilfracombe, $5^h\ 30^m$; at the Foreland, $5^h\ 35^m$; at Minehead, 6^h; at the Flatholm, $6^h\ 35^m$; in King Road, $6^h\ 50^m$; at the Mumbles, $6^h\ 10^m$; on Burry Bar, in Caermarthen bay, about 6^h; at Caldy and Tenby, $5^h\ 50^m$; at St. Gowen's head, and thence to Grasholm, $5^h\ 30^m$; in Milford haven, 6^h; and St. David's head, 6^h.

At Lundy island ordinary spring tides rise 27 feet, equinoctial springs 31 feet, and neaps 13 feet. In Barnstaple bay ordinary springs rise 25 feet, equinoctial

28 feet, and neaps 15 feet. In this bay, at from two to three miles from shore, a gentle stream sets to the eastward, from the time of low water to four hours flood, and then to the westward until low water again. In mid-channel, between this bay and Lundy island, the streams of flood and ebb set tide and tide each way, according to the time of flowing on the shore, at the rate of three miles an hour on springs and two upon the neaps, allowing half an hour slacking and veering out.

At the entrance of the Bristol channel spring tides rise from 22 to 26 feet; but farther up, as that channel narrows, or contracts in its breadth, the velocity and vertical rise increase in proportion; so much so that, at King road, it rises to seven and eight fathoms, and has been known still higher, while at Chepstow it sometimes exceeds nine fathoms. Between Nash point and Bridgewater bay the tide sets with great velocity over the Culver sand.

At the mouth of the Parret, or Bridgewater river, ordinary springs rise 35, and neaps 18 feet; within the Nash sands ordinary springs rise 33, equinoctial springs 38, and neaps 17 feet; on Swansea bar ordinary springs rise 30, equinoctial springs 33, and neaps 15 feet; on the bar of Burry ordinary springs rise 28, and neaps 14 feet; on Caermarthen bar ordinary springs rise 26, and neaps 13 feet.

It should be understood that, within the range of Swansea bay and its offing, at about five miles west of the Scarweathers, the first quarter flood sets directly toward them; after which, and until half flood, it sweeps one mile outside, nearing the west end of the Nash sands, and ultimately setting, till high water S.S.E. by compass, which points well outside of all. It averages a rate of 4 and 5 knots on springs, and 3 upon neaps, and changes exactly at the same time that it ceases to rise on the shore, but slack water always lasts half an hour. Midway between the western Scarweather and Mumbles head the flood and ebb set W.N.W. and E.S.E. tide and tide, though farther in the ebb sets directly from Swansea and Neath. One mile outside the Mumbles, and close in shore, a sharp eddy sweeps between Swansea and the Mumbles head, from half flood to low water.

Directly off Rhwchiwyns point to the S.E. of the bay, the ebb stream branches through the Shord channel, on the north side of the Scarweather, and continues a W.N.W. and W. b. N. course from half ebb till low water; the flood stream returning over the same ground between low water and half flood.

Between Milford Haven and Caldy island the flood stream runs eastward; but from Milford to Ramsey island it runs to the northward along the coast, until half-past 8 o'clock. Between the Grasholm and Smalls it runs northward until 9 o'clock; it then changes, and sets to the southward for six hours. The northern stream shifts gradually from N.N.W. to N.E., and the southern stream from S.S.E. to S.W. From Ramsey island towards Cardigan the flood sets to the eastward, and thence along shore.

Through Ramsey sound the tide sets to the northward, from half flood until half ebb, on the shore; and spring tides run 6 knots. Off Lenny head the spring tides' stream runs at the rate of about 3 knots; neap stream, only one or one and a half. Between Skomar and Grasholm, the strongest flood stream sets to the northward, at the rate of 3 to 4 knots; between Grasholm and the Barrel, 5 knots; and between the Barrel and the Smalls, at the rate of 6 knots; neaps about 2½. On the west of the Bishop and Clerks, spring tides run with the same velocity as at the Smalls. Between the North bishop and the Bass bank spring tides run at the rate of 5 knots; and off Strumble head, 4 knots; and thence to the northward the velocity decreases.

Near the Smalls, and north of the shoals to Grasholm, the flood stream sets N.E. b. N., and the ebb S.W. b. S., with a mean velocity of 2½ knots. The stream of flood has been found to make 4½ hours after low water by the shore at St. Anne's head. Duration about six hours each way with very little slack tide. But it has been observed that, over the shoals and through the different channels, the velocity of the tides is greatly increased, and there is reason for believing that on springs the rate is nearly six knots.

There is always a strong tide under these shoals, which is, of course, increased or decreased according to the vertical rise. This is of consequence when working up near them, as some advantage may, in the day time, be taken of it, by keeping

on the proper side. Its influence will be manifest to any vessel thus situated, as she would nearly make her course good when under their lee, but swept away furiously on opening the different passages. Should it be desirable to have the true tide, it will, therefore, be requisite to keep on the north or south side of all the shoals, according to the ebb or flood.

The Coast of Wales, from St. David's Head to Aberystwith.

From ST. DAVID'S HEAD to STRUMBLE HEAD, the bearing and distance are E.N.E. ¼ E., 10½ miles; between these, at the distance of 5½ miles from the former, and close to the land is Abercastle island; and to the north-eastward of the island, at about three-quarters of a mile north from Abercastle creek lies Abercastle shoal, with 3½ fathoms water on it. This will be avoided on the north side by keeping St. David's head a sail's breadth open of Penclegher point. There are also some rocks and shoals, called the Sledges, lying about three-quarters of a mile from shore, between St. David's head and Penclegher point: these dangers have from 13 to 16 fathoms water close to them.

CARRIGONAN BAY, at the extremity of Strumble head, is a convenient place to stop a tide in, when the wind is to the eastward of north. The anchorage is about a cable's length to the southward of the island, with the sound of the island open, in 7 fathoms' water, on good holding gronnd: in most other parts of the bay the bottom is foul. Should the wind shift round to the westward, a vessel of 10 or 12 feet draught may run through between the island and the main, by keeping in mid-channel, or rather nearer to the island.

FISGARD BAY is about 5 miles to the eastward of Strumble head, and is a good roadstead with all winds, except those from north to east; at the entrance it is more than three miles broad, and it has on the S.W. side good anchorage in 3 or 3½ fathoms' water, on sand and clay, with the Cow rock, which is always above water, bearing N.W. b. N. from one quarter to half a mile distant. The Cow rock is very remarkable, and lies about three-quarters of a mile within Anglas point. There are several other rocks within it, and others without it, to the distance of nearly two-thirds of a cable's length; the best anchorage is about one-third of a mile S. b. W. from it, in 3½ to 4½ fathoms; the ground is good for holding, and you will lie better sheltered from northerly and N.W. winds. Vessels of 10 or 12 feet draught may go up to the quay on spring tides.

This bay contributes much to the safety of vessels frequenting Cardigan bay, &c. Here they may find shelter from the strong southerly and westerly gales that prevail during the winter months; but they must be cautious of the strong northerly and N.E. winds of that season, which send a heavy sea into it. Small vessels have at times been forced on shore by them, by anchoring too openly in the bay. It is to be observed, however, that the ground is excellent, being sand over clay; and there is, in general, a sufficient depth of water for large ships at all times.

PORTHQUELOID ANCHORAGE is situated on the east side of Fisgard bay, near Dinas, at about 2 or 2½ cable's length to the southward of a remarkable rock, which is always above water, a little to the northward of a small sandy cove, and about 2½ cables' length from the shore, in 5 fathoms water, on gravelly bottom. Here the above-mentioned rock will appear open of the point near it, bearing about N. ¼ E.; and vessels may lie safely with easterly winds: they may also lie farther to the south and west, but will not be so well sheltered.

ABERDINAS ROAD.—This anchorage is off the middle of the bight, where Dinas houses are, on the east side of Dinas head: vessels may stop here with westerly winds, in 3 or 4 fathoms water, on clean ground, a little more than two cables' length from high water mark.

NEWPORT HARBOUR.—The bar and channel of this harbour lie about half a cable's length from the shore, directly below the village of Newport, and about 2 miles to the eastward of Dinas head. There are 13 feet water on the bar at

high water spring tides, and 7 feet at neap tides: it is therefore fit for small vessels only, which, when in, lie a-ground on fine sand, sufficiently sheltered from all winds. The channel may generally be distinguished by the appearance of the water in it; but there are no other marks for it. A vessel may stop in 3 or 4 fathoms water, on clean sand, on the eastern side of Newport bay, off Pystile, at about half a mile from shore.

CARDIGAN HARBOUR, &c.—E. ½ S. 5 leagues from Strumble head is Kemaes head, and 2 miles E. ½ N. from it, is Cardigan island. Between this island and Kemaes head lies Cardigan harbour, fit only for small vessels that can take the ground easily: the channel is nearest the east side of the bay, and has 14 feet water in it on a spring flood, but it is liable to shift; therefore, those who are not well acquainted should take a pilot. In moderate weather a ship may anchor anywhere in the road without the harbour, in about 6 fathoms water.

Along the coast of Cardiganshire there are several ledges or rocky flats, which dry every spring tide; but of these, there are none without the headlands, except the Patches and Sarn Gynfelyn.

From Cardigan island to New Quay head, the bearing and distance are, east 12½ miles; and to Aberystwith, E. b. N. 27 miles. There is tolerably good shelter for small vessels from W.N.W. winds, to the eastward and southward of New Quay head, at about 1½ cables' length from shore, in 2½ fathoms water, with Penwiger point and the house a little to the westward of it in a line, bearing about W. b. N. About half way between this anchorage and the mouth of Llanina rivulet there is a rock that dries with spring ebbs only.

ABERAERON is a little port, lying 4 miles E. ½ S. from New Quay head: within this line of bearing there are several patches of foul ground; and to the eastward of the entrance there is a shoal which extends a mile from the coast, with from 2 to 6 feet water on it; there is also a rocky spot, nearly dry at low water, half a mile to the W.N.W. Two lights in a line, bearing about S.E. ¾ S., are the marks for its entrance by night.

ABERYSTWITH HARBOUR.—This is a narrow creek, with a bar lying across the entrance. At about a cable's length within the bar, a perch is placed, and beyond it, upon the land, a white moveable board: these kept in a line will lead directly over it. This harbour may be distinguished at a distance by Peny Dinas mountain, which rises remarkably steep at the south end, and by a ruinous castle at the N.W. end of the town: it is fit for vessels of 9 or 10 feet draught only. In the night, if any vessel is seen off, two lights are placed, one on the perch, and the other on the white board, for a direction over the bar.

SECTION X.

THE SOUTH COAST OF IRELAND FROM CARNSORE POINT TO THE RIVER SHANNON.

VARIATION, 25° TO 27° W.

CARNSORE POINT is the S.E. extremity of Ireland, and bears from St. David's head, in Wales, N.W. ½ N., distant 44 miles; from the Smalls lighthouse, N. b. W. ½ W. 38 miles, and from Cape Cornwall, N. b. E. ½ E., 41½ leagues.

The TUSKAR is a remarkable high rock, situated in latitude 52° 12′ 9″, longitude 6° 12′ 37″, at the distance of 6¼ miles E. b. S. from Carnsore point. It is distinguished by a lighthouse, constructed on the principle of that on the Eddystone, in the English Channel, was first lighted on the evening of the 4th of June, 1815, and is regularly continued from sunset to sunrise. The light is revolving, and has three faces, one of which appears refulgent every two minutes. On one side a shade of red glass is interposed, so that, in each revolution, one face appears of a deep red colour every six minutes. Every half minute a bell is told to denote the proximity of the rock in foggy weather.

The rock is 15 feet above the level of high water, and the light 101 feet above the same. Ships coming from the westward, and bound through St. George's channel, should endeavour to see the rock, or its light, before they shape their course to the northward. This light may be seen 15 miles in clear weather, but the red face not more than 10 miles.

About three-quarters of a mile to the south-westward of the Tuskar there are some sunken rocks, with only 9 feet water on them, and less than half a mile west of it are other rocky heads; to avoid these keep a mile from that side of the Tuskar. Nearly midway between the Tuskar and the main lies the Bailies bank, the south end of which bears from the Tuskar west, and from Carnsore point E.S.E. 2½ miles, and thence extends N.N.E. for 2 miles, it is narrow, having 5 to 7 fathoms on it. To avoid this bank on the east side, keep nearer to the Tuskar than to the main: near this sand there are 16 fathoms water. In a bay opposite to the west side of this sand, ships may anchor in 6 or 7 fathoms, at about three-quarters of a mile from the shore.

The SPLOUGH is a rocky shoal of 3 feet, lying about half a mile S.E. b. S. of Greenore point; and at a short distance from that point lie some rocks, partly above water, called the Carricks, on one of which is a perch. There are also some rocks, of a similar description, lying near to the eastward and northward of Carnsore point, called the Wilkeens.

The NEW GROUNDS is a sandy shoal lying N.E. b. N. and S.W. b. S., about 2 miles in length and a quarter of a mile in breadth: the least water on it is 13 feet, which is about one-third from its S.W. end; on the N.E. end are from 3 to 4 fathoms. Its S.W. end lies E. ½ S. 3¼ miles from Greenore point and N. b. E. 4 miles from the Tuskar; and at this end the Whitehouse of Roslare appears in a line with the south end of Fort mountain, near the southernmost hummock. At the N.E. end Greenore point bears W.S.W. ½ W. and Fort point N.W.

The DOGGER SAND lies near the entrance of Wexford harbour, and is about two miles in length from the N.E. to S.W.; the former part frequently shifts,

and always dries; the other parts dry gradually. This sand may be avoided, and also the spit off Raven point, by bringing the fort houses W. ½ S. and the extremity of Fort point west.

WEXFORD HARBOUR is clean and sufficiently sheltered, but too shallow for vessels drawing more than 9 feet water, and those with neap tides must have 4 hours' flood to go in; the entrance lies between the north end of the Dogger sand and the Raven spit. To sail in, pass at about a cable's length from the dry part of the Dogger, or keep the houses of Fort W. ½ S., or the extremity of Fort point west; give the point a berth in passing it; then run in and anchor on the west side of it, at a cable's length or two from the shore.

If necessary, vessels may anchor in Greenore or South bay, off Roslare house, in any depth from 2 to 4 fathoms.

WATERFORD HARBOUR.—The Hook point of Waterford, on which a light-house stands, bears from the Longships' lighthouse off the Land's End of England N. ¾ E., distant 42½ leagues, and from the Smalls' lighthouse N.W. ¾ N., distant 18 leagues. The Hook lighthouse is 152 feet above high water, and exhibits a bright fixed light.

The eastern side of the deep estuary of the river Suir is formed by Hook point, on which there is the lofty lighthouse tower. The breadth of the channel between this head and Red point, on the opposite side of the river, is somewhat more than 2 miles, and the soundings between them vary from 5 to 10 fathoms. The western shore between Red point and a remarkable promontory called Creden head is tolerably bold; but along the eastern shore there is a dangerous rocky flat, which extends with an irregular edge from Church town up as far as the fort of Duncannon. From Creden head also a corresponding flat extends as far as the town of Passage, by which the channel is gradually contracted, so as not to exceed one-third of a mile when abreast of the fort. The flats which defend the western shore are denominated Woods town and Passage strands, with the long bank of Drumore; that to the eastward is called the Duncannon or Ballistraw Strand; the two former and the last dry wholly at low water, the Drumore only partially.

Besides these a bar of shingle and sand stretches nearly across the channel, in an E.N.E. and W.S.W. direction, between Creden head and Duncannon fort; it lies above the former three-quarters of a mile, with only 12 feet on it at low water great spring tides, and in many places less.

CREDEN HEAD lies 3½ miles from the Hook lighthouse, in the direction of N. b. E., and very close to it lie the rocks called the Woolpacks, which indeed constitute part of the headland. The land between Swiny point and Creden head is high, while that between the Hook and Broom hill is altogether as low; and the lighthouse being whitewashed, is not readily distinguished when coming from the westward during the day, because there is no dark contrasting land behind it. The soundings between the Hook lighthouse and Duncannon fort are, with the exception of the bar above mentioned, tolerably regular, the deepest water being rather nearest to the eastern than to the western shore, so that a vessel may work in at any time to an anchorage between the Bar and Duncannon fort by common attention to the lead, but a pilot is necessary to proceed further. In all parts of the channel there is tolerable shelter, except with the wind from between W.S.W. and S. b. E.

Two lights are exhibited in Duncannon fort, one above the other, to direct vessels to that point; but the lower light is shown only from half-flood to half-ebb, and an additional lighthouse has also been erected at the distance of 5½ cables' lengths, N.N.E. ¾ E. from it. These two lighthouses kept in a line will lead in the best channel across the bar. The tower of the new lighthouse is circular and of a white colour, and carries a fixed bright light 128 feet above high water. The light in the fort lighthouse is 53 feet above that level.

Coming from the southward, and bound into the river Suir, steer for Creden head, giving the Hook point a berth, when rounding it, of half a mile, in order to avoid the in-shore tides, which are irregular. When abreast of Creden head, which is bold close-to, steer for Duncannon fort, taking care to keep as nearly as possible upon a straight line drawn from the former to the latter, which will

clear the Ballistraw spit on the starboard hand, and the Drumore bank on the other. The north-western angle of Duncannon fort bears from the pitch of Creden head N.E. ½ N., and the distance between them is 2¼ miles. When approaching Duncannon fort, keep your lead going, and be cautious of the edge of the Ballistraw sand, which is connected therewith, endeavouring to round the fort at 1½ cable's distance; then bring the westernmost extremity of Broom hill in one with the N.W. extremity of the fort, and when distant from the latter a quarter or half a mile, you may anchor in from 2 to 5 fathoms water, with tolerably good ground.

The above mark will also lead you up in the fairway of the channel towards Ballyhack church, which is white; and as soon as the Perch, which stands on the north-eastern edge of the Drumore bank, appears in one with the northern part of the town of Passage, you may steer for the latter, taking care to give the Perch a berth of a cable's length at least. The Perch is conspicuous, having a small cask, and it stands close to the south-eastward of a salmon weir. Two lights in Duncannon fort, one above the other, were formerly exhibited, to direct vessels to that point; but an additional lighthouse has been erected at the distance of 5½ cables' length, N.N.E. ¾ E., from them. These two lighthouses kept in a line will lead in the best channel across the bar. The tower of the new lighthouse is circular and of a white colour; and carries a fixed bright light 128 feet above high water. The lower light of the Fort lighthouse is now only shown from half flood to half ebb. A small tongued shoal runs off southerly from Ballyhack point for above half a cable's length, on which the salmon weir is erected: the southern part of this shoal has only 3 feet on it at low water. In order to avoid it, do not give the perch, before alluded to, a berth of more than a cable's length; or, keep the north-western peak of Futtock hill in one with the low point of land which projects north-westerly from Ballyhack.

It is not, however, probable that any vessel without a pilot would venture above Duncannon anchorage, still less that she would attempt to run further than Passage town, between which and Ballyhack there is good anchorage one-third nearer to the latter, by which the greatest strength of the tide, both ebb and flood, will be avoided, and in from 3 to 5 fathoms water.

Above Ballyhack, Seedes bank on the eastern shore, and another shoal on the opposite side, render the navigation tortuous and difficult; and as the course of the river changes at Cheek point from north-east to south-west, a skilful pilot and the assistance of the flood are necessary to carry any sailing vessel up to Waterford. When there, 2 fathoms will be found at low water at a ship's length from the handsome quay of that thriving city.

On the western side of the entrance into Waterford, a pier was constructed for the reception of the post office packets from Milford Haven; they laid afloat there at all times, with good shelter, and at night were led in by a light on the Pier-head, which to the southward appears red, and bright to the northward of the pier; but those packets are now sent up, by a circuitous passage, to the quay of Waterford. Though Dunmore pier affords a secure anchorage from westerly gales, yet it is ill calculated for a refuge harbour, from its very confined space, and from its shallowness, there being within the pier-head only one spot with more than 14 feet, and 9 to 12 being its usual depth at low water.

It is high water at Creden head on full and change days at 5 hours and 30 minutes, and spring tides rise and fall 13 feet, though much depends on the direction of the wind. Southerly winds cause an additional elevation of 2 feet, and northerly winds an equal depression.

Directions for sailing in from sea.—Sailing in from sea for Waterford harbour, you will descry the Sleanaman mountain, which should be brought to bear N.E., and on that bearing it will lead in sight of Hook tower, which should not be approached nearer than 2 cables' length, in order to avoid falling into the irregular stream of tide which sets round it.

SWINY HEAD lies 4 miles N.W. b. W. from Hook point, and about a quarter of a mile to the southward of this head, are three small islands called the Falskirt, which are steep-to. About 2¾ miles westward of Swiny head is Brownston head,

and thence to Great Newtown head, the bearing and distance are N.W. ½ W. 2¼ miles.

TRAMORE BAY lies between Brownston head and Great Newton head—is a place notorious for shipwrecks, and ought, therefore, to be carefully avoided. In thick or hazy weather, when the Hook tower could be seen, this bay has frequently been mistaken for the entrance of Waterford, and many ships have thereby been lost. Strong winds from S.S.E. to W.S.W. force a heavy rolling sea into it, and the flood tide sets with great velocity towards Rineshark harbour, in the east side of it; which, operating together, render it almost impossible for a ship caught in the bay to weather the heads. The ground is so foul and rocky that cables have frequently been cut, and vessels thus lost. The north-west part of the bay is the only place where there is any possibility of saving the lives of the crew, or any part of the cargo; for the east side is so shoal and rocky, that ships get involved in terrible breakers at a considerable distance from shore.

But, in order to prevent such losses in future, and to distinguish this place from every other part of the coast, the Corporation for preserving and improving the port of Dublin, &c., have caused beacon-towers to be erected on each side of the bay; that is, on Brownstown and Great Newtown heads, with the intention of warning mariners to keep at a distance from this dangerous coast, as there is a strong indraught into this bay, which frequently draws into, and entangles vessels in it, when they approach too near. There are now three towers on Great Newtown head, and two on Brownstown head; which, with the present lighthouse on Hook point, distinctly point out those prominent points of the coast. On the central tower upon Great Newtown head, is an Herculean statue, with one arm pointing towards the Hook tower on the east; these objects, therefore, are too remarkable to be mistaken.

RINESHARK HARBOUR, as before said, is in the eastern part of Tramore bay; its entrance is narrow and dangerous, having neither perches nor buoys. There are 9 or 10 feet water in the channel at half tide, but the danger of getting on the point of sand that forms the entrance is so great, that no stranger should attempt it without a pilot, unless in case of urgent necessity. In such case, endeavour to have four hours' flood, and keep within a cable's length of the eastern shore: having passed the Bar rock, keep the lead going, as the channel is steep-to on each side, from Bassa Tierra point inwards, where you may anchor in safety.

But observe, that if embayed here, when the wind renders it impossible to get out, it is considered best to run on shore in the N.W. part of the bay, rather than attempt the harbour, as this will afford the best chance of saving the lives of those on board.

From the Hook point eastward.—Slade bay is about 1½ miles north-eastward from the Hook lighthouse, and is generally foul and rocky. The best anchoring place is opposite a stone wall, which runs a little way up from the shore, with Slade castle and pier in a line, in 5 fathoms water, fine sandy bottom. Slade pier dries at low water, and at high water spring tides there are only 11 feet water between the pier heads.

From the point next to the northward of Slade harbour, a narrow ridge of rocks extends about three-quarters of a mile S. b. E. It has only 2 feet on it at low water. This is called the bridge of St. Bricane; the mountain of Forth, which is about Wexford, kept open to the eastward of Bagenbon head, will lead clear of it.

FETHARD is a small harbour to the northward of Ingard point; it dries before low water, and is fit for small vessels only. Between the pier-heads there are 8 or 9 feet at high water, spring tides, and 6 or 7 at neap tides. A rocky ledge extends eastward about two cables' length from the extremity of the point: this may be avoided on the north side, when sailing in or out, by keeping an old castle, seen at the south end of Fethard trees, on with the quay head. There is also a long rocky shoal, lying about half a mile to the eastward of Ingard point, the least water on which is 5 feet. The mark for it is a summer-house, which stands below Fethard trees, in a line with the before-mentioned castle. To the eastward of Fethard is the entrance of Bannow water, and to the southeastward of it the

Keroog isles and Ballyteig bay. Ballyteig castle, or Crossfarnogue point, lies 12 miles E. b. S. from the Hook point, and from the former to Carnsore point, the bearing and distance are E.S.E. southerly 8 miles.

The SALTEES.—Nearly 4 leagues S.E. b. E. from the Hook lighthouse is the S.W. point of the Great Saltee island, which thence extends to the E.N.E. about a mile. The Little Saltee island lies about a mile to the E.N.E. of the Great Saltee, and is about a half mile in length in the same direction; this is connected to the main land, at Ballyteig castle point, from which it is distant about 2 miles, S. b. W. ¼ W., by a narrow ridge of large stones, having from 6 to 9 feet on it at low water, called St. Patrick's Bridge. On the S.E. end of Little Saltee a beacon is erected.

At half a mile to the northward of the S.W. point of the Little Saltee is a small rock with only 3 feet water on it; and S.W. ½ W., a cable's length from the same point, is another small rock, which appears at half ebb. From the N.E. part of the Great Saltee, extending northward about a quarter of a mile, there are two rocky shoals with one fathom water on them, and N.W. b. W. three-quarters of a mile, another dangerous rock. These are avoided, when sailing between the Saltees, by keeping nearer to the little island than to the great one.

There is also anchorage off the N.W. point of the Great Saltee in 5 or 6 fathoms water.

CONINGMORE ROCK lies 1¼ miles S.S.W. from the S.W. point of the Great Saltee island, and is always above water. Coningbeg rock lies about 1¼ miles W.S.W. from Coningmore, and from the S.W. point of the Great Saltee S.W. 2½ miles. This rock appears at half ebb. When Coningmore rock is in a line with the south end of the Great Saltee you will be to the eastward of Coningbeg rock.

The BRANDY ROCKS lie nearly 1¾ miles east from Coningmore rock, and about the same distance S.E. from the south point of the Great Saltee island: these are two rocks and appear at half ebb. These rocks may be cleared on their west side by keeping the south end of the Great Saltee island N.N.E. ½ E.; on their south side by keeping Coningmore rock N.W. b. W.; and on the east side by keeping Balleyteig castle open to the eastward of the Little Saltee island. The Red bank lies S.W. b. W. 1½ miles from Coningmore, and S. b. E. 1½ miles from Coningbeg with 4½ fathoms water.

From the beacon on the S.E. end of Little Saltee bearing S.S.E. 2 miles, lies the Bore, with 3 fathoms; S.E. about 1½ miles from the beacon is Short Bohar, with 4 fathoms, and S.E. b. E. ½ E. nearly the same distance from it is the Long Bohar, with only 13 feet; between this last and the shore are spots of 4 and 5 fathoms.

The SALTEES LIGHTVESSEL.—This vessel was moored off the Saltees on the 1st of September, 1824, in 30 fathoms, with the Great Saltee bearing N.E. ¼ E., distant about 4½ miles; the Hook lighthouse of Waterford harbour, N.W. ¾ N. 11¼ miles; and the Tuskar lighthouse nearly East 6½ leagues. The station of the lightvessel is to the southwestward of the Coningbeg rock, and it has three masts, on two of which lights are hoisted. In foggy weather a gong is tolled.

From the south end of the Great Saltee to Carnsore point, the bearing and distance are E. b. N. 13½ miles, and thence to the Tuskar rock, E. b. S. 6 miles.

About 2 miles E. from the Little Saltee island are two small rocks, called the Tuns, with not less than 4 fathoms on them.

The BLACK ROCK, which is always above water, lies 8 miles E. ¼ S. from the south end of the Great Saltee island, 2 miles W. ¼ S. from Carnsore point, and 8¼ miles W. ½ S. from the Tuskar rock.

The BARRELS are two rocks lying S.E. ½ E. about a mile from the Black rock, and appear at half ebb. These may be avoided on the south side by passing at 1½ miles to the southward of the Black rock until Greenore point comes open to the S.E. of Carnsore point. Vessels bound to the westward should keep Greenore point open until the Black rock bears N. ½ W.; they may then steer about West or W. ¼ S., and pass to the southward of the Saltees lightvessel.

Tides between Great Newtown head and Carnsore point.—The times of high water, on the full and change days of the moon, are as follows:—In Tramore bay

at $5^h\,40^m$, Hook point of Waterford at $5^h\,30^m$, and at the Saltee islands at $5^h\,10^m$; spring tides rise 12 or 13 feet.

Along the coast, from Waterford to Carnsore point, the principal stream of flood sets in from the S.W. and runs along the south side of the Saltees and the Tuskar, and thence turns up to the northward into St. George's channel: the ebb sets contrary. Between Tramore bay and the Saltees the strongest springs run about 1 knot, near the Saltees 2 knots, and on the eastside of the Tuskar 4 knots.

Three or four leagues off the Hook point the tides set to the east and west during equal spaces of time, and the eastern stream continues to run until half-past eight o'clock.

DUNGARVON HARBOUR lies 15 miles to the west of Tramore bay, where vessels not drawing more than 10 feet may find good shelter, and lie on clean sand when left by the tide; vessels drawing more should not go in till high water. The shoalest part of the channel has only 3 feet at low water. At the quay of Dungarvon are 9 feet at high water spring tides, and 7 feet at neap tides; a short distance from the quay, there is 2 or 3 feet more water.

To enter the bay, keep Cruach hill, the most western and tapering of the Dungarvon mountains, N. b. E. In the mouth of this bay are two rocks always above water; the larger called Carrickapane, is nearly in the middle; pass on the east side at a cable's length, but on the west side at two cables' length. From the other rock runs a ledge which extends to Ballinacourty. The Gainers rock lies half a mile to the northward of Helwick head, extending about half a mile from east to west, and shows in some places at low water spring tides. To avoid this rock on the north side, keep the Castle at the Abbey of Dungarvon N W. b. N.; or keep the Abbey on the highest part of a hill about 2 miles from Dungarvon. A dangerous ridge of sand extends southward along Ballinacourty point, and dries at low spring ebbs, making the channel very narrow. In waiting for the tide to go into Dungarvon, anchor off Ballinacourty, about a cable's length from shore, the ground being there the best. About half flood, steer for Ballinacourty point, and near the house, come no nearer than a cable's length; or keep Ryland's turret on with the sharpest point of Knockmeldown, until past the point, then steer N.W. b. W. till Ryland's turret appears in a line with the summit of Cruach hill; then steer N.W. for Cunnigar point, and come to an anchor off the town.

A lighthouse on Ballinacourty point shows a fixed light, green from W. to N.W. b. W. and red in the direction of Carrickapane rock, but white in all other directions; it is visible at ten miles distance.

MINE HEAD bears from Helwick head S.W. $\frac{1}{2}$ W., distant 4 miles, and from Capel island E. $\frac{3}{4}$ N. 12 miles. The lighthouse on the south side of Mine head, shows an intermitting light; it is bright for 50 seconds, and then eclipsed for 10 seconds, making a revolution once a minute. The lantern is 285 feet above high water, and the light visible in clear weather at the distance of 20 miles between the bearings of E.N.E. $\frac{1}{2}$ N. seaward to W. $\frac{3}{4}$ S.

YOUGHAL HARBOUR lies about 16 miles W.S.W. from Helwick head, and affords shelter for vessels of 13 feet draught, and at spring tides vessels of 16 or 17 feet may enter over the bar and ride afloat opposite the town in from 20 to 30 feet at low water. On the west side of the entrance is a lighthouse, being a circular stone tower, the lantern is 78 feet above high water, showing a bright fixed light, visible at the distance of 6 miles. A Bar extends across the entrance of the harbour with from 3 to 6 feet at low water spring tides. A patch of rocky ground named the Bar rocks, having only 3 and 4 feet on them extend one-third of a mile in a S.W. b. W. direction, bearing from the lighthouse S. b. W. $1\frac{1}{4}$ miles; this patch lies just outside the Bar. At half a mile from the Bar rocks, in a westerly direction, is the Blackball ledge, with a depth of 9 feet, it lies rather more than three-quarters of a mile S.S.W. from Blackball head, and $1\frac{1}{2}$ miles from the lighthouse.

The leading mark through the western channel is, the first hedge east of Bay view house, in a line with the Turret, which stands three-quarters of a mile from the entrance of the harbour on the east side, bearing N.E. $\frac{1}{2}$ N.; Bay view house is also on the east side of the harbour, and $2\frac{1}{4}$ miles from the entrance. Run in *with these objects* on, until you get within three cable's length of the entrance,

then steer in mid-channel or rather nearer to the western shore, and anchor before the town. To go through the eastern channel in the deepest water over the bar, bring a farm-house which stands conspicuously on the rising ground, and is W.N.W. 1 cables from the lighthouse in a line with the cottage half a cable W.S.W. from the lighthouse; steer in upon this line, the bearing being N.W. N. to the entrance of the harbour, then make for the anchorage abreast of the town as before directed.

Should the tide not serve for entering Youghal harbour, you may anchor within or to the northward of Capel island in from 3 to 6 fathoms, but with south-westerly or south-easterly winds, standing off and on is to be preferred. In order to fall in with the harbour when coming from the offing, keep Knockmeldown hill N. b. E.

It is high water by the ground in Youghal at ½ past 4 o'clock, full and change, and the tide rises and falls at the springs 13 feet. There is never less water over what is termed the bar than 4 feet at low water spring tides, nor less than 12 at high water ordinary neaps. South-westerly winds, however, have a very great effect in increasing the depth of water between Ardmore head and Capel island, so as on some occasions to produce 20 feet on the bar, while those from the north-east have as great an influence in decreasing it.

The course from any position off Capel island, to a corresponding position off the Hook lighthouse, is East, and the distance is 12 leagues. Upon this island there is a tower 123 feet above high water.

BALLYCOTTIN ISLANDS lie W. b. S. 6 miles from Capel island. A circular stone tower stands on the outer island from which a flashing light is exhibited. The tower and gallery up to the bottom of the lantern sash is coloured red. The light shows a bright flash every ten seconds, it is 195 feet above high water, and may be seen at the distance of 18 miles. It bears from Capel island W. ¾ S. 6 miles, and between them is a small rock which is dry at very low water springs. Another small rock, called the Smith's, bearing W. b. S. from Ballycottin 1½ miles, also dries at low spring ebbs only. To avoid this rock on the south, keep half a mile from the shore; or keep Capel island open without Ballycottin islands. Poor head is about 7 miles W. ¾ N. of Ballycottin islands, and about 3½ miles N.W. b. W. from Poor head, is the entrance of Cork harbour. S.E. ½ S. from Poor head at about 2 miles distant lies the Pollock rock, with 25 feet water on it, and 7 to 9 fathoms close round it, between this rock and the shore, the depth is about 8 fathoms.

It is recommended that vessels bound to Cork or to parts further westward, and obliged to bear up in a westerly gale, should take shelter in Ballycottin bay, instead of running for the dangerous bar harbour of Youghal, or of losing still more ground by going further to the eastward. Here they will be within three hours communication by land with Cork, and ready for any favourable change of wind.

The bay affords good shelter with winds from S. to N.E.; the soundings are regular and gradual, and the bottom on the west side of the bay is a smooth fine sand upon yellow and brown good holding clay. The most convenient anchorage for shelter in a south-westerly gale is with the outer island bearing S.S.E., Kilmahon church N.N.W., and the Coast Guard Station house about S.S.W., in 3 or 3½ fathoms at low water, or further out according to the draught of the vessel.

The outer Island is high and bold, with deep water close to, and no danger, so that a vessel from the westward may haul close round it, and suddenly get into smooth water.

The sound between the Islands should not be attempted but under very urgent circumstances, and then the S.E. island must be kept close on board. Between the inner island and the main, the rocks dry at three-quarters ebb.

In case of a shift of wind to S.E. or E., which, however, very seldom blows, vessels should work out as quickly as possible.

CORK HARBOUR.—From the Land's End to the entrance of Cork harbour is N. b. W. ¾ W. 46 leagues. In making for Cork from the southward, keep Knockmeldown Hill about N.E. until you see the Old Head of Kinsale, a bluff

point with a lighthouse on it. From this head, the entrance of Cork harbour lies E.N.E. 5 leagues.

On approaching Cork harbour from the westward, the land is everywhere bold and free from danger, with the exception of the Daunt rock, shown by a Black buoy, a description of which will hereafter be given.

When coming from the eastward, a large ship should keep at the distance of at least 4 miles off the land until past the meridian of Poor head, in order to avoid the Pollock rock, which lies S.E. b. S. distant nearly 2 miles from the head. It consists of a ridge of rocks about 400 feet in length, lying east and west. The least water the surveying officers found on it was 26 feet; the fishermen, however, state that there is as little as 18 feet. The west end of Gyleen village open of Poor head N.N.W. ½ W., will take a vessel outside, or to the south-westward of the rock; and Roche Tower in one with Poor head, about N.W. ½ W. will lead inside of it. Between this rock and the land there are from 8 to 10 fathoms. Vessels drawing less water may, of course, in moderate weather, pass within the Pollock, and round Poor head much nearer, merely taking care to avoid the Hawk and Quarry rock; the former lies S.W. b. W. rather more than 2 cables' lengths distant from the point of Poor head, with only 10 feet water on it: the latter, the Quarry rock, so called from the slate quarry abreast of it, distant about 1½ cables' lengths, lies S.E. b. S. from the head, about 3 cables' lengths; there are 3 feet water on this rock.

From Poor head to the entrance of the harbour the ground is generally foul, and large ships should not approach the land nearer than a mile, until due south of the lighthouse, especially off Roche Tower, on account of several patches of rocks, some with as little as 21 feet on them, lying at the distance of a third of a mile off the land on which the tower stands.

The principal objects about the harbour which first present themselves are the high bluffs of Dogs Nose and Ram point; the former is on the eastern side of the harbour, with Carlisle Fort on its bluff summit, and a little to the right of the fort, Prince Rupert's Tower, a square building, connected with a remarkable double wall, which has been previously mentioned as being one of the marks for avoiding the Daunt rock. Ram point is opposite to the Dogs Nose, and on the western shore of the harbour, which is here about half a mile; on the crown of this point stands Camden Fort; and on the same land to the westward will be seen Templebreedy Church, which is white, with a spire. On approaching nearer, the lighthouse will be very conspicuous, standing on Roche point, 78 feet high, and forming the outer eastern point of the entrance.

Nearly half a mile to the eastward of the harbour's mouth, a small white building, called Roche Tower, will be seen; and a third of a mile farther, and rather embayed, Trabulgan house, a long, large, white building, backed by some woody ground. A little to the southward of the latter there is a small white house (the herdsman's) standing on the bluff eastern point of the bight.

The land to the eastward of all these objects rises to the height of 280 feet, and is covered with heath towards the sea. Towards Poor Head it bends into a small bay, where there is a space of 180 yards of clear shingly beach, and is the only spot from Roche point to Poor head where it would be advisable to beach a boat or small vessel in a case of emergency. A little to the westward of this beach, and protected by a projecting rocky point, is the little village of Gyleen, the resort of most of the eastern pilots, who, on the usual signal being made, will come off in almost any weather.

The western shore is composed of a succession of bold rocky points, but presents nothing very remarkable. Ringabella house, on the south side of the bay of that name, will be seen opening from behind Fish point; and a small stream, the Minane, navigable about 2 miles, by boats only, empties itself into the bay.

To the north of this bay stands Myrtleville cottage, in the small rocky cove of Beaulna; and off the north point of this cove, at the distance of 1½ cables' lengths from the cliffs, there is a half-tide rock, called the Carrig. Between Myrtleville point and this rock the bottom is rocky, and somewhat shoal to the distance of 2 or 3 cables' lengths; but from the rock to the entrance of Cork Harbour, the points on this western shore are bold and safe.

ROCHE POINT LIGHTHOUSE stands, as has been before mentioned, on the eastern side of the entrance. It is a white building, with a long white wall attached to it. The lantern is 92 feet above the level of high water, exhibiting, from sunset to sunrise, a fixed light, red towards the sea; and bright towards the harbour.

Two hundred yards S.W. from the lighthouse are the Cow and Calf Rocks; the former is never covered at high water, but the latter uncovers 3 feet at low water spring tides; they are pretty bold, close to, with 9 feet water between them. The Tower on Haulbowline Island, in one with the outer face of Camden Fort bearing about N. ¼ W., will lead clear to the westward of these rocks.

From Roche point to Dogs Nose, the distance is 1⅛ miles, and in the interval there are two shoals to be avoided; namely, the Harbour Rock and the Turbot Bank.

The Harbour Rock, which is the outermost danger, lies just inside Roche point, and nearly in the middle of the entrance. It is a large rocky patch, with the depth of water varying from 15 to 30 feet; the pinnacle on its N.E. part, which carries only 15 feet, is usually termed the Harbour Rock. The marks when on this pinnacle are, the lower Flagstaff on Haulbowline just open of the lower wall of Camden Fort, and a gate on the hill just inside Roche Tower, a little to the right of the centre building of the Coast-guard station. There are two buoys on this shoal—one on its north-eastern, and one on the north-western extremity. The former is white, with a red rim, and is placed just to the eastward of the pinnacle of the rock. The north-western buoy is red, with a black rim.

About N.N.E., one-third of a mile from the Harbour Rock, and rather more towards the western shore, is the Turbot Bank, composed mostly of sand, and the least water on it 19 feet. Two buoys are placed on this bank also—one on its eastern side, white, with a black rim, and the other on the western end, red, with a white rim.

Nearly abreast of this bank, between Weaver and Ram points, a shelving bank projects from the western shore to the distance of 3 cables' lengths. On the extreme point of this shoal and abreast of some huts, a white buoy has been laid down in 4 fathoms. Off Ram point also, a white buoy has been placed in 4 fathoms, to mark the verge of the shallow water.

The opposite or eastern shore to the southward of the Dogs Nose is pretty bold. The navigable channel here for line-of-battle ships is 2¾ cables' lengths wide.

To the N.W. of the Dogs Nose there is a black buoy on the eastern side of the channel, and close to it a small bank with 17 feet. Vessels of only 12 feet draught may safely go inside the buoy, taking care to keep the lighthouse open of Dogs Nose point.

From the Dogs Nose buoy up to the outer anchorage, or Man-of-War Roads, the average breadth of the channel is 3½ cables' lengths. It is bounded on the west by white buoys, and on the east by black buoys, all of which are laid in 4 fathoms at low water.

With a southerly or leading wind, ships entering the harbour usually take the passage east of the Harbour Rock, the foul ground to the southward of the lighthouse and of Roche Tower being previously avoided by keeping the whole of Haulbowline Island, except the eastern storehouses, shut in behind Ram point. When nearly abreast of the lighthouse, look for some cottages immediately adjoining the left part of Cuskinny Wood, to the eastward of Queenstown, which being kept just open of the Dogs Nose, will lead the vessel through in the best water until past the Turbot Bank, or till Camden Fort bears N.W., then keep a N. ½ E. course, or for about the middle of Spike Island, until well past the Dogs Nose, leaving the black buoy to the eastward; after which steer N.E. ½ N., keeping between the white buoys on the western hand and the black buoys to the eastward, which will lead into Man-of-War Road.

The best anchorage in this roadstead is in mid-channel, with Ballybricken (a large white house on some woody ground on the main to the westward) in one with the north point of Spike Island bearing about W.N.W., or with an old spire on that island bearing W.N.W. ¼ W., and Carlisle flagstaff S.S.W. ¼ W. in or

9 fathoms, mud and sand; moor N.W. and S.E., with an open hawse to the S. W.

If, on arriving off the harbour with a northerly wind, it should be necessary to anchor on account of the ebb-tide or other causes, it would be advisable in so doing to keep the mouth of the harbour open. An eligible close berth may be had with Roche point lighthouse bearing N.E. b. E., and Templebreedy Church N.W. b. N., in 10 fathoms muddy sand.

In working into the harbour, it is prudent to pass on the port tack through the Sound, between the Harbour Rock and the Turbot Bank; but, should the wind admit of it, there is nothing to prevent the endeavour to weather the latter, particularly as the flood-tide in this part is always strongest. Care should be taken to tack at some distance from the eddy tide, off the high land of Carlisle.

Beyond Carlisle Fort no better directions can be given than those before stated, viz., to keep between the buoys marking the channel, leaving the white buoys to the westward and the black buoys to the eastward, and moreover taking the utmost precaution to avoid getting into the eddies.

QUEENSTOWN and HAULBOWLINE.—To proceed from Man-of-War Road to the anchorage off Queenstown or off Haulbowline, in a line-of-battle ship or any ship of more than 20 feet draught, it is better to have a pilot, on account of having to pass over the Bar that connects the Spit Bank, which runs off from Haulbowline, to the Eastern Flats; there are less than 5 fathoms on this bar, and on its north point a small knoll called the Bar Rock, has only 16 feet on it, but is marked by a white buoy.

A vessel might, however, at half-tide, with a fair wind and the channel pretty clear of shipping, run up to the anchorage off Haulbowline without any great difficulty, by keeping just to the eastward of all the white buoys, till the white buoy on the Bar Rock is rounded, and then steering parallel to the Queenstown shore, at rather more than a cable's length from it. There is good anchorage anywhere in this channel from the Old Barracks as far up as the eastern part of Haulbowline.

On the east elbow of the Spit Bank off Haulbowline Island, a lighthouse, on screw piles, is erected, exhibiting a steady Red light, visible from N.N.E. ½ E. to S.E. b. E. ½ E., round by the eastward. It is a guide for vessels rounding the Spit by night.

From White point, on the northern shore, and opposite to the western part of Haulbowline, a ledge of limestone rock runs off in nearly an E.S.E. direction upwards of 200 yards, with as little as 12 feet on it. A black buoy, with "Rock" painted thereon, has recently been placed off the extremity of this ledge.

From White point, as far up as Passage, called the West Passage, there is sufficiently deep water for any sized ship, the only danger being Shawn-more rocks, lying about 200 yards off the Queenstown shore, abreast of Monkstown.

The deep water terminates at the northern part of Passage or off Horsehead, and merchant-vessels, bound to Cork, must wait here for the tide, the least water to be passed being only 4½ feet at low-water springs. No vessel can go up drawing more than 16 feet; indeed 14 feet draught is the greatest commonly used. There are six buoys laid down by the Harbour Commissioners in this space. There is a permanent tide-gauge at Horsehead, graduated so as to represent the height of water up through Lough Mahon; it however requires correction, indicating 1½ feet too much.

There is a very narrow and tortuous channel, with only 6 feet in it at low-water spring tides, from Ram point to the westward, at the back of Spike and Haulbowline islands, which some of the coasting steamers occasionally use at high-water spring tides; but, in its present state, not being buoyed, it is only available by those possessing requisite local knowledge. The stream of ebb makes down this channel three-quarters of an hour before it does off Queenstown.

From Man-of-War Road there is a good channel, likewise to the eastward, at any time of tide for ships drawing as much as 18 feet, through the East Channel and up the East Passage; the deep water terminates at the opening above the *passage*, where vessels resorting to Ballynacorra (the nearest communication to

Middleton) are obliged to wait for the tide to proceed upwards. A black buoy has recently been laid down on the north side of the entrance of the East Channel.

All manner of supplies can be obtained at Queenstown, and almost any repairs may be accomplished at perhaps as little cost as at any part of the kingdom.

There is a good dry dock at Passage for vessels of 13 feet light draught, being 237 feet long, 60 feet wide, and 37 feet wide at the gates. At Cork there are two patent slips: and also iron-works, where steam-machinery may be repaired at London prices.

At Queenstown high water takes place at full and change, at $5^h\ 3^m$. Spring tides rise 11ft. 10in.; neap tides 9ft. 9in. The average run of the tides does not exceed the rate of 2 knots; but about the Turbot bank and Harbour Rock, and also in the narrows off Monkstown and in the East Passage, they often attain as much as 3 knots.

DAUNT ROCK lies nearly S.S.E. ¾ E. three-quarters of a mile from Roberts head: it is a small insulated pinnacle, with only 10 feet on it at low water, and rising from a rocky patch about a cable's length in diameter. It is marked by a Black buoy, S.S.E. ¾ E., about a cable's length from the pinnacle. There is a fine clear passage between it and Roberts head, with 18 fathoms in it, the marks for which are the Little Sovereign in one with Reanie head, or Templebreedy Church (near the western side of the entrance to Cork harbour), over Morris head, bearing nearly N.E. ¾ N. Prince Rupert's tower, in Carlisle Fort, kept exactly between the two walls running down from it, and which, when in that position, bears nearly N.E. b. N.; though not a very good mark, this is the only available one, and will lead half a mile to the south-eastward of the Daunt.

About half a mile round Roberts head there is a Coast-guard station and good landing for boats, in a snug inlet called Roberts Cove; and beyond this the coast trends about N.E. forming the small bluff terminations of Cork head and Morris head, and of others, but all of which are quite bold as far as Ringabella bay.

The set of the tides along this part of the coast takes the direction of the shores generally; the stream of ebb running in the offing from half an hour to an hour after it is low water by the shore. The strength of the flood never amounts to a mile an hour, and the ebb but little exceeding it, except off the pitch of the Old head, where it runs at the rate of 2 and 2½ miles respectively.

BARRY HEAD, a bold craggy headland, about 2 miles E. ¼ N. from the little Sovereign, forms the eastern extremity of a bight called Newfoundland Bay, the shores of which are of the same character as the head, but it contains no outlying dangers.

Two miles east of Barry Head stands Reanie Head, which is the most projecting part of the land after rounding the Old Head of Kinsale. It is quite steep, the cliffs rising perpendicularly to the height of about 140 feet, and it is remarkable from a number of white gate-posts, which are more particularly conspicuous when coming from the eastward. Reanie Head is often though vulgarly called Flat Head, but the true Flat Head lies about half a mile farther westward, and though bluff and perpendicular, is only about half the elevation of the true Reanie Head.

Between Barry Head and Reanie Head, Jordan Bay opens a fine clear space, with grey sandy bottom, and decreasing in depth gradually to the shore.

To the southward of Flat Head foul ground runs off to the distance of three-quarters of a mile, having two rocky pinnacles on it, one with 3 fathoms at 2 cables' lengths off, and the other with 5½ fathoms about half a mile off the Head; Roche Tower, near Cork Lighthouse, in one with Roberts Head, about N.E. b. E. ¼ E. will clear it to the southward.

About half a mile E.S.E. ½ E. of Reanie Head there is another small rocky patch with 3¼ fathoms on it, but having a clear passage between it and the Head: Cork Head open of Roberts Head about N.E. ¾ E. will clear it to the eastward.

From Reanie Head the coast trends more to the northward, and at 1½ miles therefrom we come to Roberts Head, on which, or rather half a mile inland, stands a Telegraph tower. Though bluff, it is not so perpendicular as Reanie Head, but is quite bold-to.

Between these two headlands intervenes Rocky Bay, from the middle of which a long rocky spit, called Carrigadda, runs off, and dries at low-water springs to the distance of 3 cables' lengths from the shore, in broken masses of rock; the whole bay is rocky and shallow.

OYSTER HAVEN lies 2 miles to the eastward of Kinsale, between Ballymanus and Kinure points; it is very small, and available only for vessels of less than 13 feet draught. About three-quarters of a mile from the entrance it divides into two branches, neither of which is navigable for vessels of burthen.

To the N.E. of Ferry point (on the western side of the haven) there is anchorage in 15 to 20 feet, but only space enough for one or two vessels; and half-way between Ferry point and the Coast-guard watchhouse, on the eastern shore, lies the Harbour rock, with only 4 feet upon it: the deepest and best channel is to the westward, between the rock and Ferry point.

The Sovereigns are two remarkable rocky islands off Oyster Haven; the westernmost, called the Great Sovereign, 300 yards in length, lies half a mile south of Ballymanus point, and is divided into two portions, with a boat passage between them: the western portion is very rugged to the top, and the eastern is flat; both are precipitous and inaccessible, bold-to, and may be passed at the distance of half a cable's length.

The other, or Little Sovereign, lies from the Great Sovereign E.N.E. ½ E. half a mile, and about 1½ cables' lengths off the eastern point of Oyster Haven, between which and the Little Sovereign there is a sunken rock with only 9 feet on it. It is very steep to the southward, but slopes towards the main.

Between the Great and Little Sovereigns, and also between the Great Sovereign and Ballymanus point there are clear passages into Oyster Haven.

The OLD HEAD of KINSALE is a bold promontory, of an average height of 190 feet, bounded by steep rugged cliffs, and projecting about 3 miles southerly from the general run of the coast, with which it is connected by a low isthmus. About a mile from its extremity it is again nearly separated, by an isthmus of only 130 yards across, although nearly of the same elevation as the other land, and through this isthmus the sea has worn two subterranean passages. On the latter isthmus stand the ruins of the Baron de Courcy's castle, two towers only of which now remain visible from seaward. In order to fall in with the Old head when coming in from the offing, keep Knockmeldown mill N.E. b. E.

At the southern extremity of the Old head stands a Lighthouse (white with two red belts); a fixed light is shown there, bright to seaward, but red in a line to the Horse rock in Courtmelskerry bay. It may be seen at the distance of 21 miles, being 236 feet above the level of high water.

On coming from the westward, immediately after rounding the Old head and the Bream rock, which lies under its eastern side, and which is flat and steep-to, the harbour of Kinsale, where the Bandon river empties itself into the sea, will be easily distinguished by the well-defined valley of the river, and by a very conspicuous white church at the upper cove of Kinsale, just over Charles fort, bearing about N.E. b. N.

From the Old head to the entrance of Kinsale harbour, the course and distance are N.E. b. N. 4½ miles. The intervening coast contains two bays, viz., Eastern Holeopen and Bullen bays; the latter, which is the northernmost, is both foul and rocky. The entrance to the harbour of Kinsale lies between Stookeen point to the westward, and Prehaun point to the eastward, leaving a clear passage into it of 3 cables' lengths in width.

From 3 to 4 cables' lengths inside of Prehaun point, and opposite to Money point, is the first or outer anchorage off a valley, near which there are a few huts called the Lower Cove; should a vessel anchor here, the Bream rock may be brought nearly to touch Prehaun point, she will then be in about 4 fathoms at the distance of 1½ cables' lengths from the shore. In beating up to this anchorage, a vessel must not stand too close to the western shore, which is mostly foul. About half way between Stookeen and Money points, and at a cable's length from the shore, lies the Farmer rock, which uncovers after three-quarters ebb.

About a quarter of a mile inside of the Lower cove there is a similar feature,

called the Middle Cove, off which commences a diagonal bar of sand and shingle, carrying 16 or 17 feet water, but there is a small patch with only 12 feet on it, to pass to the eastward of which, bring Fairfield Cottage (in the Elizabethan style, at the Upper cove), over the south-western bastion of Charles Fort (a strong fortification on the eastern side of the harbour, conspicuous from the offing, and about a mile inside Prehaun point), which mark may be kept on till within half a cable's length of the fort. The vessel will then have crossed the bar, and will at once deepen the water from 4 to 5 fathoms, and by keeping about the same distance from the shore she may anchor off the village of the Upper Cove in about 5 fathoms' water, and on good holding ground at about 1½ cables' lengths from the shore.

Opposite the Upper cove, and on the outer side of the harbour, there is a high projecting point, called Blockhouse point, on which are the remains of the old fortification of James fort, and off which lies a muddy flat, just a-wash at low-water spring tides. All the northern shore of this point is shallow. The western shore from Money point up to Blockhouse point is one extensive flat, and so steep-to that abreast of Charles Fort the depth suddenly decreases from 4 fathoms to 4 feet.

From the Upper cove there is a fine deep channel close along the northern shore up to the town of Kinsale, distant about half a mile, and there is also a depth of about 5 fathoms three-quarters of a mile up the river beyond the town.

Kinsale is a safe snug harbour, owing much, however, of its security to the protection afforded to it by the Old head. The objection to this harbour is the difficulty that long vessels find working in and out, as its narrow channel is only 3 cables' lengths wide at the entrance between Stookeen and Prehaun points, and it decreases to 1 cable's length from the Middle cove upwards.

The proximity of the superior harbour of Cork has, however, deprived this port of all its trade.

Supplies of all sorts may be obtained, and water procured from any of the streams running down the valleys.

At full and change, high water takes place at $4^h\,43^m$. Spring tides rise 12 feet, neap tides 9 feet 6 inches, and the range of neaps 7 feet 3 inches.

The approach to Kinsale is clear, with the exception of the Bulman, a pinnacle rock with 3 feet on it at low water, and rising from a small rocky bank lying 2 cables' lengths off Hangman point, the next to the southward of Prehaun point. The sea always breaks over this rock in bad weather; but the marks for passing to the westward of it are well defined, viz., the White church, before mentioned, at the Upper cove, just open of Prehaun point; and at night a small bright light which is shown in the roof of one of the buildings in Charles fort (though not conspicuous by day), which must be kept in sight open of Prehaun point.

Between the Bulman rock and Hangman point there is a good clear passage, the mark for which is the north end of the Great sovereign in one with Frower point (the next point to the eastward of Hangman point), bearing about E.S.E. ½ E.; and to pass clear to the southward of it, bring Blinkinure point (to the eastward of Oyster haven) just open of Frower point, and bearing nearly E. ¼ S., or the Great Sovereign, twice its own apparent breadth open to the southward of Frower point.

COURTMACSHERRY BAY lies between Seven Heads to the westward and the Old head of Kinsale to the eastward, the latter bearing from the former E. b. S., distant 7 miles; this is the most dangerous bay on the whole of the S.W. coast of Ireland, being full of dangerous rocks and shoals.

About the middle of the bay, and nearly 1½ miles from the northern shore, there is a rock, on the western extremity of the patch called the Outer barrels, which uncovers at low water springs, and on which a Perch has recently been placed; between this rock and the northern shore lies another large patch of foul ground, called the Inner barrels, but which rarely uncovers: there are passages between the Inner and Outer barrels, and also between the former and the shore. Besides the above, many other patches exist here; one, a pinnacle rock, known as the Blue bell, lies nearly half a mile S.E. b. E. ¾ E. from the Outer barrels, with only 2 feet on it at low water spring tides; and another about half a mile

W.N.W. ⅝ W. from the Outer barrels, called Black Tom, which is also a pinnacle rock, carrying 9 feet; Lislee church in one with the left or southern part of Lislee village, and just open to the northward of Horse rock, bearing N.W. b. W. ¼ W., will lead outside or to the southward of all these dangers, and through the channel between the Black Tom and the Horse, and which is the widest passage either to Broadstrand bay or Courtmacsherry harbour.

COURTMACSHERRY HARBOUR lies at the N.W. part of Courtmacsherry bay, and although it is not adapted to vessels of large size, yet had it formerly been better known, many lives and much valuable property might have been saved. The entrance to the harbour may be distinguished by a well-defined point, the southernmost of the harbour, called Land or Courtmacsherry point, over which stands a sort of summer-house or turret, of an octagonal form.

In approaching, keep the conical hill of Burren, on the north side of the harbour, shut well behind Land or Courtmacsherry point, and bearing about N. b. W. ¼ W., which will lead nearly a quarter of a mile to the westward of the Black Tom rock. The water shoals gradually up to the above point, which should be rounded very close, and the southern shore kept on board. This shore is high and rocky, but the opposite side is formed of sand hills. The first bar runs off from Courtmacsherry point, carrying 10 feet at low water springs, and on which, with S.E. winds, the sea breaks very heavily. Within this bar there is another with 9 feet on it, but which, from being sheltered from the heave of the swell, a vessel can generally ensure passing at the same height of tide that will admit the outer bar to be crossed.

A quarter of a mile within Courtmacsherry point there is a hole with 15 feet at low water, in which a ship of heavy burthen may ride safely, by anchoring about two-thirds over towards the northern shore, and steadying her with a kedge to the southward. From this spot to the quays at the village the channel is narrow, winding, and varying in depth from 7 to 12 feet at low water. The village of Courtmacsherry lies a mile within the entrance of the harbour; it is a small, poor village, with no trade beyond a few small coasting-vessels, and affording no supplies. Above the village the harbour expands to a considerable area of mud and sand, drying at low water, and extending 2 miles up to the village of Timoleague, which is only something better than Courtmacsherry, and to which no vessels but hookers ever go.

It is high water in Courtmacsherry harbour at full and change at $4^h\ 36^m$; spring tides rise 11 feet and neaps 9 feet: at spring tides the stream is very strong.

From Coolmain point, the eastern point of entrance to Courtmacsherry harbour, the coast trends to the north-eastward, and presents similar features, in its eastern bend, to those of the sandy strands round Galley head, viz., a long sandy beach, called Garretstown strand, with patches of rocks lying upwards of 2 cables' lengths from the shore. From thence to the Old head of Kinsale, the shore is bolder and apparently free from danger.

SEVEN HEADS is a bold, bluff headland, on which stands one of the old telegraph towers; it is steep-to, with deep water close under it; but to the eastward there is an extensive rocky patch with 6 fathoms on it, over which the sea breaks heavily. The bight to the northward of this patch is called Seven Heads bay, in which there is good shelter from westerly winds, and excellent holding-ground in from 6 to 9 fathoms sand. The northern part of the bay rises almost perpendicularly to the summit of Barry hill, 340 feet above the sea, from whence the land trends to the eastward, and sinks rather abruptly to the low point of Barry. A quarter of a mile to the eastward of Barry point lies the Horse rock, which is just a-wash at high-water springs, but exposes a large surface at low water: there is a clear channel between the rock and the point, both of which may be approached within 100 yards at low water. Beyond Barry point is a well-sheltered anchorage and stopping-place during westerly gales in Broadstrand bay, in 4 fathoms, on a fine sandy bottom.

From Clonakilty to the Seven heads, the coast is high and rocky, and more or less foul for about a quarter of a mile off shore. At the eastern part of this bay

there is a small bight, called Dunworly bay, but it is full of rocks and foul ground.

CLONAKILTY BAY stretches from Galley head to the Seven heads, the latter bearing from the former E. b. S., and 9 miles distant. The depth of this bay, from a line joining the heads, is 2½ miles; and, with the exception of half a mile of sandy beach which marks the entrance to Clonakilty harbour, the shores are generally high and rocky, with foul ground within a quarter of a mile. There are several rocky patches in this bay in addition to those which have been before mentioned, but few of them are dangerous to large vessels, as they all lie within half a mile of the shore. Clonakilty harbour lies at the bottom of the bay, its entrance being at the eastern extremity of the sandy beach before mentioned, between a high point called Ring head to the eastward and Inchydoney island to the westward. It is a tidal harbour, drying at low water, and exposing a large area of sand and mud, with only a small stream where it joins the sea, and 2 feet on the bar, though there are 10 or 12 feet within the bar. At the small village of South Ring, three-quarters of a mile within Ring head, there is a pier 230 feet long, with a depth of 6 or 7 feet where vessels generally lie. The exposed position of the entrance, open as it is to the whole swell of the ocean, renders all approach to it in southerly winds quite impracticable: but the water shoals gradually up to the entrance with a clear sandy bottom, so that, with an off-shore wind, there is good anchorage outside the bar for vessels waiting for the tide. Close to Ring head lies the Wind rock, which at low water joins the land, but at high water its summit is just a-wash; the outer part of this rock is steep-to, and the deep channel runs close round it. This harbour is quite unfit for any vessel but small coasters.

Between Ringlea point and Duneen point, 1½ miles to the N.E. of the former, lies the clean level bay of Dunnycove, which affords good anchorage in from 5 to 7 fathoms on fine sand, and with good shelter from westerly winds.

From Dunowen head, the eastern point of Dirk bay, to the eastward, the shores are indented with a few coves formed by the projections of Keameen and Ringlea points, off which there are several patches of rocks known as the Keameen, Cow, and Bellows rocks, but all of them lie within half a mile of the shore.

Immediately round Galley head lies Dirk bay, about half a mile in depth, where, in westerly winds, good anchorage may be had off the Coast-guard station, in from 3 to 4 fathoms on fine sand. At the eastern part of the bay is the Carrigduff rock, which covers at half-tide; and from which foul ground extends to the westward for nearly a cable's length.

Galley head has an elevation of about 120 feet; it is connected to the main land by a narrow isthmus, which being much lower than the head itself, causes it, when seen from the east or west, to appear like an island. On the isthmus are the extensive ruins of the old castle of Dundeady. In the direction of about S ½ E. from Galley head are two patches of rocks, called the Clout and Inner Clout; the former lies 4 cables' lengths from the head, with not less than 5½ fathoms over it; and the latter, about midway between the head and the Clout, with 3½ fathoms; there are 11 fathoms water between these rocks and Galley head.

A patch of rocks which has not yet been rigidly examined, lies about W.S.W. ½ W., 2½ miles from Galley head. It is said there are as little as 4 fathoms over these rocks, but 8 fathoms is the least depth that has been hitherto found upon them.

Half a mile W. ½ N. from the southern extremity of Galley head lies the Dhulic rock, which is a-wash at high water, but spring tides at low water expose a surface of about 60 yards in diameter. It is steep-to within half a cable's length on the north and east, but to the south-westward foul ground extends to about 1½ cables' lengths; and the ebb-tide sets on it with great velocity. There is an excellent channel between the Dhulic and Galley head, in from 11 to 13 fathoms water, the leading mark for which is to keep the spire of Rosscarbery cathedral just open of Creggane point, the eastern limit of Rosscarbery harbour: the same mark will lead 1½ cables' lengths to the westward of the Cloghna, a pinnacle rock

with only 4 feet on it, but deep water close-to; it lies about half a mile off Cloghna head, and about half way between Galley head and Rosscarbery harbour. There are also several other rocks in this bay in-shore of the Cloghna rock, all of which may be avoided by not passing to the eastward of the line of the above mark that has been given for clearing the Cloghna.

The harbour of Rosscarbery, about 3 miles to the eastward of Glandore, is scarcely worth notice, being inaccessible only to vessels of the smallest size, and all dry at low water. At high water the entrance is only about 100 yards wide, beyond which it expands and runs up about a mile to the town, a place of no trade, and frequented only by small coasters bringing coal and timber. Downeen point, on the western side of the entrance, is bold, but the shores to the eastward are very irregular and dangerous, and must not be approached. To the eastward of Rosscarbery there are two sandy beaches, separated from each other by the rugged cliffs of Cloghna head; the northernmost is called Inchy Strand, and the other, which is a mile in length, the Long Strand; the latter forms a remarkable feature in the coast, and from its eastern extremity commences a bold and rocky shore, which reaches to Galley head. The space included between Downeen point and this headland is called Rosscarbery bay.

From Rosscarbery to Glandore the coast is high and rugged, with numerous outlying rocks above water, extending about 2 cables' lengths off shore, but there are no dangers that are not visible.

GLANDORE HARBOUR.—Two miles to the north-eastward of High island is the entrance to Glandore harbour, which is easily distinguished by an old telegraph tower over the high cliffy shore of Foilnashark head. The breadth between this head and Sheela point, the western point of the entrance, is about three-quarters of a mile. About one-third of the distance across from Sheela point lies Adam island, but the passage between the latter and the point is obstructed by a rock with 11 feet on it, lying nearly in mid-channel. The eastern passage between Adam island and the main, about 4 cables' lengths wide, is quite clear, and the island on that side is bold, but on its inner or northern side, reefs and foul ground run off for nearly 2 cables' lengths. Half a mile inside Adam island there is a smaller one, called Eve island, which may be passed on either side, but the widest channel lies to the eastward. Within Eve island, and about the mid-channel towards the harbour, there is a series of rocks called the Four Dangers, all of which uncover at low water, and all carry beacons or perches, except the northern one, named the Sunk, which has 6 feet over it at low water. The east cliff on Adam island, in one with the S.E. perch, will lead to the eastward of the Sunk, and when the flag-staff at the Coast-guard station is seen over Coosaneigh point, a vessel will be to the northward of all these rocks. These patches are all steep-to, and have deep channels between them.

In Glandore harbour, although apparently more exposed, yet a vessel rides easier than in Castlehaven. The sea is considerably broken by Adam and Eve islands, as well as by the Danger rocks, and it has a finer run to expend itself up the harbour. The best anchorage is off Coosaneigh point in 9 fathoms. There is but little stream of tide in this harbour.

Supplies in small quantities may be obtained here, and water from the small streams that run down from the hills.

To the eastward of Castlehaven, and midway between it and Glandore harbour, there is a group called the High islands, though the south-eastern island alone is entitled to this appellation; it rises to the height of 150 feet. The others form a cluster of small detached islets and rocks, extending to the westward. These islands must not be too closely approached, although High island is bold and steep-to.

About N.N.E. from the High islands, and close to the main, the Rabbit islands lie so as to form the small harbour of Squince, which offers good shelter for fishing-vessels in westerly winds. There is also an inlet between it and Castlehaven, called Blind harbour, but from the shoalness of the water in its most sheltered part, it is fit only for boats.

Between High and Rabbit islands, but much nearer the latter, lies the very

dangerous rock, called the Belly; it is a-wash at low-water spring tides, but at the distance of 100 yards there is a depth of 5 fathoms all around. Castle Freke house, open to the southward of Downeen point, or the Black rock, to the southward of Horse island, in one with the northern peak of Benteane hill, will lead to the southward of it. There is a good passage between the Belly rock and the High islands.

CASTLEHAVEN.—About 3 miles N.E. of the Stag rocks is the entrance to Castlehaven, between Horse island on the western side and a remarkable high flat rock called the Skiddy on the eastern side. It is about 4 cables' lengths wide, and free from danger by not standing nearer to either shore than half a cable's length. Steer in between the two islands till the Stags are just touching the western part of Horse island, and then proceed up the harbour, keeping the Stags a little open, or touching the western point of Flea island. As the depth will be found to decrease gradually, anchor as most convenient according to the draught of water. There is a small rocky head, called the Colonel rock, lying off Reen point to the north-eastward, which makes it necessary that the above marks or a mid-channel course should be pursued. Castlehaven is not adapted for vessels of more than 12 feet draught, for they would be obliged to anchor so far out, as to be exposed to the heavy swell which a south or S.E. wind sets in to the harbour. Although to vessels under the above draught this harbour may appear a secure anchorage (for they may proceed high enough to be almost land-locked), yet during these winds it is very treacherous,—the swell breaking against the western shore, under the Rectory, is deflected up to the head of the harbour with great force, and the bottom, being of a hard sand, vessels are liable to strike heavily. According to the reports of the old inhabitants this harbour is filling up.

The village of Castle Townsend is a most miserable place. Water may be procured, but not in abundance, and supplies of any other kind, except by sending to Skibbereen, a distance of 5 miles.

Neither the ebb nor flood here possess any strength. It is high water full and change at $4^h\ 21^m$; the water rises and falls on high spring tides 11 feet.

Toe head is a bluff, bold headland, extending about a mile in length from Toe point to Scullane point. On its eastern part, over the latter point, stands one of the old telegraph towers, now occupied as a Coast-guard station. The coast is high, barren, and rocky, and at the back of the tower Benteane hill rises to the height of about 350 feet. Westward from Toe point the shore is foul, and rocks run off for nearly 2 cables' lengths.

This headland is more particularly distinguished by the Stag rocks, which lie three-quarters of a mile to the southward of the head. They are high, rugged, and precipitous, and from the east and west, show like pinnacles; the northern rock rises to the height of about 80 feet above the sea. There is a very good and safe passage between these rocks and Toe head, with 20 fathoms water over a stony bottom. To the eastward of Toe head, between Scullane point and Horse island, a distance of $1\frac{1}{2}$ miles, there is a clean clear bay with a sandy bottom, which shoals gradually to the shore.

A very remarkable inlet, called Barloge, lies $2\frac{1}{2}$ miles to the eastward of Kedge island, and communicates with an inland lake, called Lough Hyne, by a stream only 400 yards in length, with which the external water is level at half tide. This lake is very deep, one spot there being 26 fathoms. Barloge is too limited for any other than fishing boats, but it is well sheltered except from the south and S.E. The land around is very high and precipitous.

To the eastward of Barloge, between it and Toe head, there are two deep indentations called Tragomena and Western Toe Head bays, but both are unsafe and afford no shelter.

About $1\frac{1}{2}$ miles S.E. of the entrance of Baltimore harbour lies Kedge island, high, steep, rugged, but flat-topped, and 2 cables' lengths distant from the main land. The space between the island and the main land is full of pinnacle rocks, although small sloops may pass between the main and the nearest rock, where there are not less than 4 fathoms.

The PORT of BALTIMORE is formed by Sherkin island, and offers a safe

and commodious anchorage. The entrance, which is between Beacon point on the main land to the eastward, and Barrack point on Sherkin island to the westward, lies E. ½ N., 4 miles from the tower on Cape Clear, which formerly was a lighthouse. These points being high and nearly perpendicular, and the land within being also elevated, and presenting nearly the same aspect to an observer in the offing, the mouth of the harbour is not easily made out at any considerable distance; but on approaching it a telegraph tower will be seen on the high land about a mile to the eastward of the entrance, and also the ruins of a building over Barrack point, which with the splendid beacon recently erected on the site of the one which formerly stood on Beacon point, will sufficiently mark the mouth of the harbour. The Fastnet, also, kept in sight to the eastward of the south-eastern end of Clear island, will lead within half-a-mile of the entrance. The entrance is only 1½ cables' lengths wide, but both its shores are steep and bold-to, with the exception of the Loo rock, which lies on the eastern side of the entrance in a north-westerly direction from the stone beacon before alluded to, and nearly one-fourth of the distance across from the eastern to the western points. It uncovers at low-water spring tides, and is marked by a beacon on it. The Louisa rocks lie considerably within the mouth of the harbour. On the largest of them, about N.E. ½ E. half-a-mile from the Loo rock, and which uncovers about the last quarter ebb, an iron perch is placed. The ground is both foul and shallow for about a cable's length round the Perch westward, north-westward, and northward, in which directions several rocky heads occasionally dry. To the eastward of the perch the ground is clear, but the depth is under 2 fathoms. There are other ledges of rocks in different parts of this harbour, but their contiguity to the land, or their distance from the anchoring ground, render a description of them unnecessary.

The depth on approaching Baltimore harbour is from 20 fathoms at a mile distant to 14 fathoms in the entrance, shoaling rather abruptly, after passing the Loo rock, to 5 and 3 fathoms. When intending to enter the harbour of Baltimore, for which you must have a leading wind, so as to enable you to fetch the anchorage without tacking, steer boldly in N.N.E. ¾ E., without being discouraged by the threatening aspect of the cliffs on both sides, keeping one-third of the whole distance across nearer to the western than to the eastern point; as soon as the entrance is passed, a large basin presents itself to the eastward; but the space for the anchorage of large vessels is confined to the shore of Sherkin, where vessels may lie in from 3 to 4 fathoms, about a quarter of a mile within Barrack point, and off a very conspicuous ruin of an abbey on Sherkin island, which may be brought to bear west. By keeping one-third nearer to the western than to the eastern land, you pass to the westward of the Loo; and when Baltimore new church appears in sight over the sandy beach on the starboard hand going in, you will be considerably to the northward of, or within, that rock. There is always a ground swell in this harbour when the wind prevails between W. b. N. and S.E., and it increases very considerably in boisterous weather. The winds from the southward of east or west will prove leading winds in, and those which blow from the northward of east or west are fair winds out.

There is accommodation in this harbour in what is called the outer anchorage, to the south-westward of the Perch, for one or two small frigates, in at least 24 feet water; and 18 or 20 vessels, whose draughts do not exceed 9 feet, may find good shelter to the south-eastward of the Perch, between it and the town; but in this anchorage there is a rocky patch with 6 ½ feet water on it, called Wallis rock, and which is marked by a Black buoy. Vessels under the draught of 7 feet may find shelter afloat everywhere and in any numbers, or they may take the ground abreast of O'Driscoll's quay, where they will lie on the mud. In the outer anchorage, moor east and west; and in the inner one, N.W. and S.E. The town of Baltimore consists of only a few houses, and all supplies are obtained from Skibbereen, about 8 miles distant. Water can only be procured from the wells in the town.

Directly opposite the entrance of Baltimore harbour, between Spanish or Green island and Sherkin island, is the best and most frequented passage into

the Skibbereen or Ilen river, and is called the Sound: it is not more than three-quarters of a cable's length wide, but very deep. The river may also be entered from the westward of Clear island, Gascanane sound, or through Baltimore harbour; but all these passages are intricate, and should not be attempted without a pilot. The usual anchorage in the Skibbereen is in the first reach under Turk head, and from thence about half a mile to the eastward, where vessels may lie in safety in from 9 to 5 fathoms at low water. Coasters, however, can, at half-flood, go 4 miles higher up the river, as far as Old court, which is only 2½ miles from Skibbereen, but they will have to lie a-ground, except at a rocky point close to the old castle, alongside which they may moor in 11 feet at low water. The river is greatly neglected, but capable of being much improved.

The tides in Baltimore harbour set through both entrances, dividing about the Louisa rocks. The ebb sets to the southward through the sea entrance, and out to the northward through the Sound or Skibbereen river entrance. It is high water full and change at $4^h\ 23^m$; and the greatest rise and fall after a series of moderate weather is 13 feet.

GASCANANE SOUND.—In the event of a vessel being driven in between the Stag rocks and Cape Clear in a gale of wind from the southward, which always produces a heavy sea, the knowledge of Baltimore harbour becomes of the very first importance, as no stranger can attempt the passage of Gascanane sound with any prospect of success under such circumstances. This dangerous passage lies between Clear island and the Badger, a small island off the S.W. end of Sherkin island; it is divided into two channels by a large mass of rocks called Carrigmore, which at high water show some straggling heads above the water. The clearest and best channel is between these rocks and Badger island, in a depth of from 22 to 26 fathoms. In the western passage, which is only a quarter of a mile wide between the Carrigmore rocks and the N.E. point of Clear island, lies a small rock called Gascanane Rock, which gives the name to the sound. It ought to have a perch on it, as it covers at half-flood, and is steep-to all round; but the tides sweep through both these channels, especially at springs, with such velocity as to cause dangerous eddies, and no sailing-vessel should attempt the sound but under favourable circumstances; indeed it is seldom used except by steam-vessels bound round the Mizen head, when with S.W. winds more shelter is afforded to them, and the distance also is somewhat shorter.

To the northward of Clear island and Gascanane sound lies an archipelago of islands, terminating to the N.E. in Roaring Water bay, and affording an approach to Skibbereen river. This part may scarcely be termed navigable water, from its numerous rocks and shoals. Among the islands shelter may be found, but as there is no particular port or anchorage, a detailed description of them is not requisite.

LONG ISLAND HARBOUR is well sheltered, of easy access, and capable of receiving large ships, which may enter at either end of the island, and anchor any where in good ground.

There are no less than five different avenues to the anchorage: one from the south-westward between Goat island and the Black rock, one between Goat island and Long island, one between Long island and Three-Castle island, and two other passages between the Black rock and Leamcon castle.

The three first-mentioned entrances are those most free from danger, and may be resorted to confidently without a pilot, though there is water sufficiently in the others also for a line-of-battle ship. When entering by the south-west passage, you have merely to keep in mid-channel, and preserve that precaution all the way through, as well as from thence to the anchorage.

In the passage between Goat island and Long island, it is necessary to keep one third nearer to the former than to the latter, until you pass the rocky ledge which runs out in a north-westerly direction from Long island, and of which you will be to the northward when Coghlan's tower at Crookhaven appears in one with the northern side of the high wedge-shaped rocks, called the Green islands; you must then as before preserve the mid-channel, until you reach the anchorage.

Coming from the westward or south-westward, and intending to enter the Sound by the south-eastern passage, range along the southern side of Long island, giving the shore a berth of a quarter of a mile, or rather more; by keeping thus near to the latter island, you will avoid a dangerous rocky ledge which projects in a south-western direction from Three-castle island, extending thence nearly one third of the channel across, and on which there are only 12 feet at low water; the long southern mark for this shoal is, the south-western end of the Western Calf shut in with the south-western extremity of Cape Clear island. Having rounded the eastern point of Long island, you must, if in a large vessel, anchor as soon as Cape Clear old light tower comes in one with the said point, taking care also not to shut in the Tower on Brow head with the southern sides of Gun point and Coney island, in order to avoid a spit of sand which projects north-easterly from Long island, and which, partially drying, divides the eastern from the western anchorage, and also to avoid a rock which lies in the mouth of Scull harbour. There is a communication from one to the other anchorage at all periods of tide, to the northward of the above spit, and though somewhat narrow, yet the water in the fair-way is deep, varying from 3 to 7 fathoms. The mark to avoid the northern extremity of this spit, and to preserve the deepest water, is, Brow Signal-tower in one with Gun point and with the southern extremity of Coney island; and the long western mark for the northern projection thereof, is, Brow tower in one with the highest of the rocks called the Green islands. The best position for mooring, in what is termed the western anchorage, is one-eighth of a mile to the eastward of Coney island, and as near mid-channel as circumstances will admit: and the most favourable position for mooring in the eastern anchorage, is, with Cape Clear old light tower in one with the eastern end of Long island, and in mid-channel also. The greatest vertical rise and fall of water in Long island sound, after a series of moderate weather, is 12 feet, and it is high water, full and change, at 4 o'clock.

About half a mile from the Black rock, in the direction of W. ½ N., lies a very dangerous sunken rock, on which there are only 10 feet water; the marks for which are, Leamcon high tower (not the castle) in one with the western end of the Green islands, and the chasm in Goat island rather open to the southward of the Black rock. In boisterous weather the sea breaks tremendously upon this rock as well as on the rocky heads in its vicinity. By keeping the Mizen peak in one with Alderman head, or by keeping Three-castle island in sight to the southward of Goat island, you will pass considerably to the southward of it.

The eastern anchorage above alluded to may be frequented by frigates, in limited numbers, either to obtain supplies or as a refuge in bad weather; from hence, also, vessels may put to sea with easterly winds, at a proper time of tide, which they cannot do from Crookhaven.

SKULL HARBOUR is pretty well sheltered, the ground good, and the water in the anchorage from 2 to 3½ fathoms. There is only one rock to be avoided, which lies in the middle of the entry, and is dry at two hours' ebb.

There are several other places among the islands near Cape Clear, into which vessels may run, and find safe anchoring in times of distress.

CAPE CLEAR.—The land in the vicinity of Cape Clear is high, precipitous, and bold. The lighthouse on Cape Clear island remains, but the light is discontinued, the Fastnet light being substituted for it. There are two small coves in the island, one on the south-eastern side, and the other on the north-western side, denominated North and South harbour, but neither of them afford permanent shelter or common convenience to vessels larger than the Irish hookers, though they may be, and indeed have been, made useful to others in cases of great emergency. The southern cove is the most extensive as well as deepest; but in boisterous weather, from any quarter to the westward of N.W., or eastward of N.E., the reflux of the sea is so powerful as to draw vessels from both, occasionally to sea, however well secured they may be. In order to fall in with the Cape, when coming from the offing, keep Hungary hill N. b. W., or Mount Gabriel N. b. E.

The western shore of Cape Clear island is not so bold as that to the eastward,

and should not be approached nearer than half a mile, particularly the north-western point. Between Cape Clear, and the islands denominated the Calves, are also ledges of dangerous rocks, though they lie much nearer to the latter than the former. No part of the coast, to the eastward of the western Calf, should be attempted without a pilot.

Between Cape Clear and the Shannon, the land increases in height as you proceed to the northward; but this part of the coast is seldom wholly free from fog and haze during the summer months, and is generally annoyed by powerful gales and a turbulent sea during the winter season. There are, however, many well-sheltered harbours and roadsteads westward of Cape Clear, the access to which is easy. The land has a very broken irregular appearance.

The FASTNET lies nearly W. ½ S. from Cape Clear, distant about 5 miles, and rises 98 feet above the level of the sea. The bottom westward, southward, and north-eastward of the Fastnet, is both shoal and rocky, particularly to the north-eastward; in this latter direction there is a flat rock at the distance of a quarter of a mile from the Fastnet, having only 9 feet at low water; the long eastern mark for it is, Baltimore tower appearing in one with the highest part of the Black rock, which forms the south-western end of Cape Clear island. When navigating, therefore, in the vicinity of the Fastnet, do not approach nearer than one mile. The Mizen peak in one with Brow signal tower, leads through midway nearly between the Fastnet and the Cape. The Peak, if kept open to the westward of Brow head, will lead you about half a mile to the south-westward of the Fastnet. These two latter marks are given here in the event of partial fog, to which this part of the coast is very much subject.

A lighthouse was erected on this rock in 1854, 92 feet high from the base, and 148 feet above high water; it is a circular tower, having a broad red belt painted horizontally. The light is bright, revolves every two minutes, and may be seen in clear weather at 18 miles distant. It superseded the light on Cape Clear island, which was discontinued when this was lighted.

The hidden dangers near the Irish coast, north-westward of Cape Clear, are, comparatively speaking, few; those principally to be feared are as follows:—the Breaker, off Three-Castle head; the Crow rock; the south-western tail of the Great Skellig; the eastern projection of the Lemon, and the different sunken rocks among the Blasquets. The other rocks in this quarter, as well indeed as the shore itself, are steep and bold close-to.

The space between Cape Clear, Long island, Crookhaven, and the Fastnet, is perfectly free from danger, though in boisterous weather the sea breaks here and there violently, caused by the rough elevations of the ground.

When coming in from sea towards the land, neither Long island nor Goat island can, in the first instance, be clearly discerned, owing to their proximity to the main land, with which, indeed, they appear to be identified. The Fastnet rock, however, if kept S.S.W. ½ W., or Leamcon high tower, if kept N.N.E. ½ E., will lead you directly to Goat island, and as you proceed will open the passages eastward and westward thereof. Mount Gabriel in one with Leamcon tower and castle, bearing E.N.E., ¼ E., will open the western avenues; and the south-western end of Cape Clear kept just open of the south-western end of the western Calf island, bearing S.W. b. S., will lead you to the south-eastern passage between Long island and Three-castle island.

MIZEN HEAD lies about 12 miles N.W. b. W. from Cape Clear, and the Castle head 2 miles N. b. E. from Mizen head. This head is remarkable from having a castle on it with three towers. Sheep's head lies N.N.E. 4 miles from Castle head. The two last heads form the entrance to Dunmanus bay.

When running in from the offing for Crookhaven, the opening to which cannot be made out till very near the Alderman head, steer in from the Fastnet, north, keeping the latter rock due south as near as may be, until Mizen peak comes in one with the Alderman head. In doing this you cannot be deceived, because at the same time, or nearly so, Mount Gabriel will appear in one with Leamcon signal-tower and castle to the north-eastward, and the Brow head (on which there is also a signal-tower) will appear to close in with the Alderman head to the west-

ward. The harbour will now begin to unfold itself: the revenue officers' houses on the northern shore will first be seen, and ultimately Coghlan's white look-out tower on the southern side.

CROOKHAVEN is a very convenient place for vessels drawing 14 feet water, during bad weather or easterly gales, against which it affords the most ample shelter.

Vessels drawing upwards of 12 feet cannot, during a great spring tide, bring Coghlan's tower more southerly than S.S.W. by compass, without touching at low water; in fine weather, however, no inconvenience will arise from sueing.

When you have fairly opened the harbour, run right in, keeping directly in mid-channel. The signal-tower on Brow head, three times its own apparent breadth open to the northward of O'Driscoll's house (a remarkable white house on the eastern part of the peninsula, and standing entirely by itself), west, will lead you to the northward of the Alderman rock, and is also the mark for the fair-way of the entrance.

The Alderman rock lies off the head which bears that name, and is consequently on the southern side of the entrance. Two distinct heads of this rock are always above the water, and of some considerable extent.

The bottom in Crookhaven is dark-blue mud, remarkably soft as well as deep, and there is no danger whatever therein, excepting one solitary rock which lies off Granny island, which shows at low-water great spring tides. The long eastern mark for this rock is Leamcon tower, just open to the southward of the bluff point of Rock island. Vessels, therefore, of any burthen, in the event of loss of anchors, or otherwise in distress, may boldly run quite up the haven until they take the ground, provided they keep in the middle of the channel. Pilots are always ready, and will come off in any weather when signalled.

You cannot, however, enter Crookhaven unless the wind is to the southward and eastward of S.S.W. by compass, or to the eastward and northward of N. b. W.; but when the wind happens to be foul for Crookhaven, it will prove fair for Long island sound. You may anchor with westerly and northerly winds, one mile north-eastward of the Alderman rock, in very good ground; but great circumspection must be used in providing against southerly winds. There is a light-house on Rock island point, on the north side of the entrance of Crookhaven: the lantern is 67 feet above high water, and exhibits a fixed bright light, visible at 4 leagues' distance.

The space between the Alderman head and Mizen head is generally steep-to, having from fifteen to twenty fathoms, within one quarter of a mile; there are, however, some sunken rocks to the westward of Brow head, as well as to the south-eastward of Mizen head; by keeping Leamcon tower in one with, or open of the Alderman head, until Three-castle point appears open to the westward of Mizen head, you will pass very considerably without them.

There is a small inlet between Mizen head and Brow head, and which is separated from Crookhaven by a narrow isthmus of sand, called Barley Cove. On several occasions this bight has been mistaken by foreigners for a good harbour, and which it appears to be when viewed from the offing. There is, however, no safety in it, even temporary, with any wind, particularly from the westward, though it may help to preserve lives on an emergency. There is a rock directly in the centre of it which shews occasionally, as well as some others in its vicinity, but the western shore close under the Mizen land is pretty clear.

About half a mile from Three-Castle head, in the direction of W. ½ S., lies a sunken rock, with only 20 feet water over it at low-water great spring tides: here the sea in boisterous weather breaks very heavily. By keeping Hungary hill ever so little open to the westward of the pitch of Sheep's head, you will pass considerably to the westward of it; and by opening out Bird island, a huge rock so called in Dunmanus bay, three times its own apparent breadth northward of Three-Castle head, you will pass close to the northward of it. The south side of Bird island, touching Three-Castle head, is the mark for the centre of the rock. There are several other rocky heads between this breaker and the land, with different *depths* of water over them; it is not safe, therefore, to pass between either.

Three-Castle head is 2½ miles to the northward of Mizen head, and is rendered remarkable by the old castellated building which stands on its summit.

The soundings, on a supposed radius of five leagues and a half from Mizen head, in any direction between N.W. b. W. ½ W. and S.S.W. ½ W., do not materially differ, either as to depth or quality of ground. The former varies only from 60 to 62 fathoms, and is principally of an oazy nature. Nearer to Mizen and Brow heads the ground partakes of more variation in quality as well as in depth; and there are several sunken rocks and elevated patches of rough ground in their vicinity, the principal of which are Mizen rock, and the patch called Sheeheys Rocks: there are 27 fathoms upon each of these rocks, and 40 fathoms all round and between them; they are consequently not dangerous, otherwise than by the ebullition they occasion in bad weather.

When running in from the Western Ocean, for the purpose of rounding Cape Clear, the quality of the ground is of much greater consequence than that of the depth, for so long as the ingredients brought up by the lead remain free from oazy matter, you cannot be nearer than 6 leagues to any part of the Irish coast between the Skelligs and Brow head, let the depth be what it may; but you may be considerably farther from it. On the other hand, if oazy ground be obtained in any depth of water between 62 and 92 fathoms, you may be sure that you are within that distance, and consequently to the northward of the latitude of 51° 10′ N.; for, were you to the southward of that parallel, the ground between those limited depths would be totally free from oaze, until you had advanced as far eastward as the meridian of Cape Clear. This fact will prove of great importance to vessels navigating here in thick weather, or when striving for an offing to the westward, with scant south-westerly winds.

When sailing eastward on the parallel of 51° 10′, or to the southward of it, if the soundings have decreased to 60 fathoms (no matter as to the quality of the ground), you may with equal confidence conclude, that you are upon, or to the eastward of the meridian of, Brow head, viz. 9° 46′ W., and may shape a course along the Irish coast, if necessary, E. ¼ S. This course will carry you 4 leagues at least to the southward of the Fastnet Rock, and nearly the same distance without all the headlands as far eastward as the Hook Light-house; such is the regularity in the direction of the Irish coast between those limits.

The centre of Hurd bank lies in latitude 51° 13′ N., and longitude 10° 37′ W. It extends in an E.N.E. and W.S.W. direction, and is 7 miles where broadest, which is at its eastern end: Mount Gabriel just appearing to the westward of Mizen peak, and the Bull rock in one with the eastern side of the westernmost Hog island, are the marks for the middle of the bank, on all parts whereof are from 83 to 86 fathoms water, and from 90 to 100 all round it.

DUNMANUS BAY, which is 4 miles wide at the entrance, has deep water and good ground nearly as far up as Manin island, but being exposed to westerly winds is not much frequented, except by small vessels, that can ride in Dunmanus creek or above Manin island. At Manin island anchor E. b. S. from the island about a cable's length, in 9 feet low water soft mud. In the creek anchor nearest the west side in 3 or 4 fathoms. In moderate weather, large ships may ride on good ground any where above Carberry island.

About a quarter of a mile W.N.W. from the N.W. point of Carberry island, is a rocky shoal with 8 feet water, very narrow from north to south, and which may generally be discovered by the swell of the sea, which breaks heavily in strong west winds. The top of Casilian hill on with the north west point of Carberry island will lead to the northward of it. Another shoal stretches from the small island to the eastward of Carberry, about half way over, with only 5 or 6 feet water on it. On the north side of Four-mile-water creek is Carrignarontee rock, dry at low water. Between Furze island and Horse island is a rocky ledge extending almost half way over, and is covered only an hour before high water. Sugaih is a rock about a cable's length from the shore, below Dunkelly houses, with only 6 feet water low spring tides. In entering is a small shoal about half a mile from Castle with 3¼ fathoms on it.

BANTRY BAY, to the northward of Dunmanus bay, is large, safe, and com-

modious for vessels of all sizes, is 3½ miles wide from Sheep's head, to the south part of Bear island. There is very little tide, and the water deep almost to the shores, with no rock or shoals in the way but what may with ease be avoided even in the night time: ships may stop any where in the middle of the bay, on good ground, and in most parts near the sides.

Two good anchorages lie at the bottom of the bay; the south one is to the northward of Bantry town and within Whiddy island, the western entrance, though very narrow, is steep-to on both sides. In the narrowest part are from 3 to 4 fathoms, and further in from 5 to 6 fathoms; on the east side of Whiddy Island are five small islands, the best anchorage is to the northward of the four southern one in 5 or 6 fathoms, quite land-locked and secure from all winds.

GLENGARIF HARBOUR is on the north side opposite to Whiddy island. It is small and with narrow entrance. Without the harbour is an island, on the east side is the passage in; which abreast of the island is half a mile wide, and has 6 fathoms. To go in, keep the east shore to avoid some rocks which lie off the island. When past the island anchor opposite the town in 3 to 5 fathoms. The place being small and the ground indifferent is seldom used but by small vessels; but during summer the largest ship may anchor outside the island, in 7 or 8 fathoms, good holding ground.

BEAR HAVEN is an excellent harbour, large, well sheltered, and good ground; with the water deep enough for the largest ships. It has two entrances, one from the west, the other from the east. The west entrance is best for vessels from the west or southward, but the other safer for strangers. You may anchor on the north side of the island, in from 5 to 11 fathoms; off Ballinakilly is the best place. Ships waiting a wind find the west end most convenient. In the west entrance are two rocks, one on the south side of the entrance always under water, within a cable's length of the shore, a little past the narrowest part of the entrance, and has 6 feet water on it at low water; the other on the north side off Dunbui bay, dry at low water; this is called the Colt Rock; it lies about one-third of the channel from Dunbui, and two-thirds from Bear island, and bears from Dunbui house E.S.E. ¼ E. To go clear to the southward of it, keep the Turret house on with Brandy hill, or steer in mid-channel, and you will clear the rocks on both sides. Between them are 12 fathoms.

There is also a bed of sunken rocks, lying nearly in the fair way of the passage, to the southward of the Colt, and stretching off from the western shore about two cables' length, with from 10 to 15 feet water over them at low water; the mark for which is the Pyramid on Hungary hill nearly in one with the Fort which stands on the north-west end of Bear island. In order to avoid all these rocks, steer as nearly in mid-channel as possible (for there are no two objects capable of being made an uninterrupted leading mark), borrowing somewhat nearer to Bear island as you close with the latter rocks, and again recovering the mid-channel course as soon after passing them.

Going in at the east end of the island, Currigavaddra rocks are the greatest danger. The easternmost of them lies about half a mile S.E. from the east point of the island, and is never quite covered but at high water spring tides. These rocks are avoided by keeping in the middle, or rather nearer to the little island Roancarrig than to the point of Bear island. A perch is placed on the outer Currigavaddra or Dog rock. The lighthouse on Roancarrig is painted white with a red belt, the lantern is 55 feet above high water and shows a fixed light, visible at the distance of 12 miles. Duncalla rock lies nearly a mile E. b. S. from Roancarrig island, and is dry about low water. To avoid this rock on the south side, keep the point of Rimore on with the sharpest topped distant hill, eastward of the head of the bay. About half a mile northward of Roancarrig island is a rock always above water, from the south side of which a ledge extends southward about one-third over towards the island. Part of this ledge is dry at low water. The northern shore is steep-to, and the best way for strangers is to go to the eastward of all the rocks, and proceed in between the little island Roancarrig and the main. There is a passage of 18 fathoms between the third and fourth rocks from the island, which are steep. To the westward of these rocks, the channel

is clear on both sides, and you may anchor on good ground, in from 5 to 9 fathoms.

THE LECQ is a single rock, lies 8 miles to the south-westward of Dursey tower, and 22 to the westward of Mizen head. It has 40 fathoms on its shoalest part, and 65 all round it. The marks for the centre of the rock are, the western declivity of the Little Hog island exactly in one with the western slope of the Bull rock and Hungary Hill pyramid a little open to the northward of the Tower erected upon Black-ball head.

THE CALF ROCK lies N.W. ½ N. from Mizen head, 15 miles N.W. b. W. from Sheep's head, and 3 miles W. b. N. from the Cat rock, off Crow head. The Bull, Cow, and Calf are three islands, always above water, near the west side of Dursey Island, with 37 fathoms water close to them. There is also some rocky ground, but not dangerous, called the Grelogh Rocks, which bear W.N.W. from Sheep's head, distant 12 miles, about 5 miles S.E. ½ E. from the Calf rock, and 4 miles S.S.W. from Crow head.

BALLYDONAGHAN BAY lies between Dursey island and Cod head, is clear of danger, with from 20 to 30 fathoms close to the shore. Quoylach bay lies between Cod's head and Goge's point, and is not much used from the number of rocks in it. On the north side a vessel may anchor in 16 or 18 fathoms, about 2½ cables' length from Innis Fernard island. A rock lies about 2 cables' length westward of the island, and a small shoal about ½ a cable's length W. b. N. with 2½ fathoms on it, the west end of Dursey island being a ship's length open of Cod's head. Within the island is a small quay on the south side.

KENMARE RIVER should rather be called an arm of the sea; in it is deep water, with good holding ground in almost all parts of it that are above a quarter of a mile from the land; small vessels may sail up to the quay at Kenmare Town at high water. The greatest danger is the Maiden rock off Rossmore island, with but 6 feet water; to clear it, keep within one-third of either side of the river: also the Roancarrig rocks, which lie about a mile to the westward of Repinacosh islands, the eastern and westernmost are always above water; but a small rock lies a cable's length S.W. from the highest of the western rocks, which dries at half ebb. The best harbours in Kenmare river are Ardgroom, Kilmechaloag, and Sneem.

ARDGROOM lies on the south side, and admits vessels drawing 13 feet water. In going in, keep the west side of Carrickavenheen Rock, which is always above water, and crosses near the east end of a rocky shoal, which goes quite across the entrance, and dries at the west end half a cable's length from low water mark. Anchor in the creek on the west side in 4 or 5 fathoms; vessels drawing 10 feet should wait for half flood to go in; a shoal lies on the east side of Carrickavenheen with but 12 feet water on it.

KILMECHALOAG is fit for large vessels and well sheltered. In bad weather small vessels will take a small creek on the east side of the harbour, and anchor in two fathoms. On the east side lies a rocky shoal, which extends W.N.W. above one-third over from the grassy cliff; on its west side are 6 feet, and on the middle only 4 feet. To clear it, keep Dutch island on the east top of Drume hill; on this hill are three sharp-topped hummocks. Anchor on the west side of Dutch island, in 5 or 6 fathoms.

SNEEM HARBOUR lies on the north side of Kenmare river, but the entrance is so bad as to admit of nothing but boats; the only safe part of the bay is that which is sheltered on the south side by the east point of Gainnish island, this part has good holding ground, and the depth of water is fit for large ships; but unless the wind be westerly, you cannot ride with more than half a cable without being in shoal water. The middle of the harbour being much exposed, and being foul in several parts, it is not safe to continue long in it.

BALLINSKELLEGS BAY lies about 15 miles N.E. b. N. from the Bull rock, Hog's head and Bolus head forming the entrance; being quite exposed to south-west winds is very little frequented. In the summer time, a ship may stop on the north side, a little more than a cable's length N.E. b. N. from the east point of Ballinskelleg island, in 4½ or 5 fathoms. About 2½ miles S.W. from Hog's

head, lie the Hog and Scariff islands; there are from 28 to 30 fathoms close to them; to the eastward of them are several smaller ones, but a particular description is not necessary.

THE GREAT SKELLIG, a lofty rock, lies 16 miles north of the Bull rock; from Bolus head, W.N.W., 8 miles; and from Bray head, W.S.W., 7¾ miles. Two lighthouses are erected on the south side, 720 feet distant from each other, bear from each other N. b. W. and S. b. E., and are so placed as to answer for leading lights for vessels sailing north or south; as, by keeping the lights open a handspike's length from each other, they will give the Foze rock a berth of 5 miles and the Bull rock a berth of 3 miles. These lights are both steady, the upper one 370 feet above the level of the sea, the lower 173 feet; visible at the distances of 25 and 18 miles.

Between the Great Skellig and the main lies the Little Skellig, a lofty rock. The Lemon rock lies N.W. ¾ N., distant 4 miles from Bolus head. The principal rock is always above water, two others dry near it at half ebb, but have 30 fathoms close to them on the north side.

VALENTIA HARBOUR is a good harbour, being well sheltered, plenty of water, and of easy access. It has two entrances; the western is on the south side of Bray head, and has no unseen danger as far up as Port Magee: the east and chief entrance is between Valentia and Beginnis isles. On Cromwell fort there is a bright steady light, 54 feet above the level of high water, and may be seen from the distance of 12 miles; it is a circular white building. To enter Valentia, bring the channel S. ½ E. by compass midway between Beginnis island and the buildings of Cromwell's fort, and when in the entrance, shutting the two north-west points of Beginnis E.N.E., take care to avoid the Passage rock, which lies 100 yards west of Beginnis island, and has only 4 feet water on it; by opening the south point of Beginnis and the east end of Valentia, where there is a village, when the old chimney is W. b. S. and opening out of the land west of it, you are clear of the rocks. Stand then along the Beginnis side to avoid the Harbour rock, which dries at half ebb, and which has a perch on it; with the west end of Beginnis shut on Doulas head, you are to the east of this rock; with the south end of Beginnis E.S.E. on the peak of Bennetee mountain, you are to the north of it; and when the same point opens the village of Cahirciveen E. b. S. you are past it. There is good anchorage all the way up to the ferry, in from 4 to 7 fathoms, and for about a mile to the west of it in 3 and 4 fathoms. A spit of gravel runs off the port of Valentia, to avoid which keep the eastern side.

The opening to the north of Beginnis island, called Lough Kay, has deep water, but exposed to a great swell; you may pass to the eastward of the islet called Church island, into Cahir river. Keep the bluff of the Black rock well shut in on Doulas head, to avoid a small rock in the passage. From Renard point on Beginnis island a shoal of sand extends with only 2 feet water on it.

The channel along the south side of Valentia island has 9 feet at low water, and no danger until near Port Magee, when a spit of sand runs off the south shore, and north of its extremity a rock which dries at low water.

DINGLE BAY lies nearly E. and W., with steep shores on each side. In moderate weather vessels may anchor almost in any part above a mile from the shore on clean ground. About half a mile to the eastward of Kaynglass point, on the south side of the bay, lies a small rock which dries at low water. Between this rock and Kalla are from 11 to 18 fathoms, and between Kalla and the bar of Castlemain harbour from 9 to 5 fathoms. Crow rock lies half a mile westward from Dingle harbour, being about half a mile from the shore; it is only covered at spring tides and is steep all round.

VENTRY HARBOUR is of easy access, and capable of receiving large ships; the ground is good, and vessels may safely ride here in summer time; but in hard gales from the westward, and sudden squalls from the mountains, it is not considered sufficiently safe for the winter season. The best part of the harbour for large ships to ride in is about half way up, and near the middle in 4 or 5 fathoms. Small vessels may go further up, and anchor near the south side of the bay.

DINGLE HARBOUR is fit only for small vessels, and they will lie a-ground at low water on soft mud. Those who go into Dingle harbour should have a leading wind and flood tide in order to avoid a ledge of rocks which extends from Loch point, half-way over to Ringbeg, they should keep only about one-third from the west side of the entrance.

CASTLEMAIN HARBOUR is very safe for ships to lie in, but is difficult of access, there being a spit of sand on each side of the outer channel; they run out from the two points which form the harbour's mouth, and extend nearly 2 miles to the westward. Near to the extremities of these spits of sand a bar runs across the channel, on which there is only 9 feet water. The sea generally breaks on the spits, and the breakers may be seen for a mile or two off. Ships drawing 12 feet water may go over the bar at half-flood; but a pilot is necessary, there being no land marks which a stranger can be made easily to understand.

DUNMORE HEAD lies about 4 miles to the north-westward of Ventry entrance; about 2 miles to the westward of Dunmore head lies the east end of the Great Blasket; from the west end of the Great Blasket, the most southern of the Ferriters islands lies S.W. b. S. 2½ miles, and the Foze rock lies from that W. b. N. 2½ miles; the Foze rock lies from the Great Skellig N. b. E. ¼ E. 16½ miles; from the Foze rock, the westernmost of the Tiraught rocks lies 2 miles N.N.E. from this rock. Innis Tuiskan E.N.E. 5 miles, from Sybel head W. b. S. ¼ S. 5½ miles, and from Dunorlin head the western point of Smerwick bay lies E.N.E. ½ E. distant 2½ miles from Sybel head.

SMERWICK BAY cannot be considered a good anchorage, from being much exposed in northerly and N.W. winds, which cause a great swell; the ground, also, though principally composed of clean sand, has numerous foul patches in it. The best anchorage is on the west side, above a cable's length from the shore, below Smerwick village, in 6 or 7 fathoms. On the east side are some rocks, always above water, but are not dangerous. The western point of Brandon bay is distant from Smerwick bay near 9 miles, E. ¼ N. on the west side of which a vessel may anchor in good weather. A small pier is erected here.

Maharee point, a low sandy peninsula, forms the eastern side of Brandon bay and the western side of Tralee bay. Off this point lie the small islands and rocks called the Maharees: deep water is between these rocks. Eastward of these rocks about 3 miles, in the middle of Tralee bay, is a steep rock called the Muchlogh. Muchloghbeg rock is always above water, lying a mile E.N.E. from the east point of Maharee, and half a mile N.E. from it lies a rocky shoal, on which are but 12 feet. To clear it, keep two-thirds from Muchlogh rock and one-third from Muchloghbeg rock. It shoals near Muchloghbeg S.W. and E.S.E. There lies, also, a shoal, with a swell on it, one quarter of a mile north of Muchlogh rock; and a quarter of a mile east of a low rock, next to north of Muchlogh rock, lies False Boat rock, which dries at half ebb. Ships sailing to the Shannon, from Brandon head, should pass to the northward of all the rocks off Mahore head.

In TRALEE BAY vessels should not lie long in the open bay, even in the summer time, but good anchorage is to be found on the east side of Samphire island; the channel being narrow, except in east or west winds, vessels should not ride with more than half a cable. In sailing in, take three-quarters flood, and keep half a cable's length from the south side of the island. The channel up to Tralee, and also that behind Fenit island, is fit for small craft only. A light-house has been erected on Little Samphire island; it is of blue stone and circular; it shows a bright fixed light from E. b. S. ¾ S. to W.N.W. and red seaward from W.N.W. to N. ¼ E. Between Tralee bay and the mouth of the Shannon lies Ballyheign Bay, in which there is no shelter.

The RIVER SHANNON is of easy access, being at the mouth near 9 miles wide, and in which fleets of the largest size may ride in safety. Its entrance is between Kerry head and Loop head; on the latter, a lighthouse is erected, showing a brilliant steady light, which, being 277 feet above the level of the sea at high water, may, in clear weather, be seen a distance of 22 miles. The entrance may also be known by the Brandon mountains, which may be seen 15

leagues off; as you approach nearer the coast you will discover the Blaskets mentioned before.

Loop head, the northern side of the Shannon, bears from Kerry head, the southern point, N.N.E. ½ E., and between them are from 14 to 27 fathoms. Three miles east of Loop head is a small light called Kilbaha. The valley on the north side of Kilkadraan, 10 miles above Loop head, having often been taken for a fair way by night, a light is erected on the top of a hill, being red towards the sea and bright white towards the river.

CARRIGAHOLT BAY lies 9 miles from Loop head; it is a good place for anchoring in, the ground being good and the depth from 3 to 8 fathoms; the marks are Carrigaholt castle N. and Kilkadraan S.S.W. ½ W. In sailing, be careful to avoid Beal bar, a spit of sand extending half a mile from Beal point, on the Kerry side, which dries with spring tides; but on the outer edge has from 3½ to 15 fathoms. By shutting Ray hill, on Kilkadraan cliff, you clear it.

Scattery Island lies about 4 miles further; it is a low island, marked by a lofty tower and battery at the south end; a rocky shoal, called the Rinana, lies S.S.W. from the battery; there are 2½ fathoms on the south part, which is the shoalest, and on other places 3½ to 4 fathoms. The mark for the south end of the shoal is, the top of Ray hill a little open to the southward of Kilkadraan cliff, or keeping over towards Carrig island. The north end lies with Scattery tower on with the west end of the Clay cliff, on the south end of Scattery, and the north part of a hummock which may be seen at Kilkadraan cliff, on with the top of Ray hill. On the east side of Scattery, you may anchor with Beal point, but not the Castle, shut in with the south point of the island, and Scattery tower N.W. b. W. when you will find a good clay ground with 6 or 7 fathoms water. On this side of Scattery, a spit of sand runs out about a cable's length S.S.W. from the point near the old building; the least water is 6 feet. A small rock lies about a cable's length from Scattery, opposite Flog island, which only dries at low spring tides. The west side of Scattery is shoal in most parts about half a cable's length from shore. On the north end is a rock, which lies about a cable's length from shore, which dries at spring tides only. From the east part of this rock is a sand bank, which extends to the N.E. part of the island.

Small vessels may anchor on the north east side of Flog island, tolerably safe, in 4 fathoms; a spit of sand runs a cable's length from the east end of the island. The Revenue pier is opposite to this on the Clare side, having but 6 feet water at the head of the creek; up to Kilrush it is fit only for boats at high water.

Poolnasherry is a small creek to the north of Scattery. Small vessels may ride safely in the channel between Comoge and Carinacoola, in 1½ fathom; in sailing in, avoid the rocky ledge of Bamaharna, on the starboard, which dries at half ebb.

Canigafoyle creek, on the opposite shore, affords shelter for small vessels under the old castle, in 2 fathoms: enter at high water.

TARBERT lies 2 leagues eastward from Scattery: a cable's length south of Tarbert point, a vessel may stop in 4 or 5 fathoms, especially at flood tide, which has but little strength here, but the ebb running 3 miles per hour in spring tides, it may be inconvenient to lie long here. The Carrickvillan or Bowlin rock lies to the eastward of this anchorage, about a cable's length from the opposite shore of Kilkerran. By keeping the town of Scattery island on or to the southward of the high water mark of Tarbert point, you avoid this rock on the south side; between the rock and Kilkerran shore there is a passage in which are 2 fathoms; those who find it necessary to go through it should keep half a cable's length from the shore; on the N.W. point is a fixed light.

Labasheda bay has good anchorage about half a mile to the eastward of Redgap, and nearly half a mile from the north shore, in from 3 to 6 fathoms. It is 4 miles above Tarbert point: ships may lie here out of the stream, with good ground and well sheltered.

Foyne's island is 4 miles above Labasheda bay. The best anchorage for large ships, off this island, is S.E. from Cahircon house, and S.S.E. or S. from Innis Murray, a small island which lies about a mile to the eastward of that house, in from 5 to 12 fathoms, good ground. Above this are many rocks and shoals.

The Beeve or Seal rocks, laying to the eastward of Foyne island about 2½ miles, are nearly in mid-channel, and begin to uncover at about two hours' ebb. A fixed light is shown from these rocks.

The Carrickaginan rock, sometimes called the Fleming rock, lies a quarter of a mile eastward from the north point of Achanish island, it dries at half ebb. Some other rocks lie about half a mile to the eastward of the little island next to the Achanish; to avoid these rocks, keep Beh castle on with the north end of the Keepers. To the southward of the Beeve rocks about 1 mile, lies the Horse rock, covered only at spring tides. Rinellan point just shut in with Achanish point will carry you clear on the north side of it; on the east side of this rock is a channel for some small craft up to Askeaton.

From the Beeve rocks to Ballinbochag point, is nearly 2 miles, a mile further is Beh castle, N.E. b. N., from which is the west end of a sand which runs in mid-channel for about 3 miles, to an islet called the Sod Isle. On this bank are four rocks; Carrickcheol or Carricacloush, is the most western, and begins to dry at half ebb; the next appears at 2 hours' ebb; the third is not quite covered at high water neap tides; and the fourth, being the easternmost, at three-quarters ebb. The west end of the sand is always covered, having from 2 to 6 feet. The extremity of this part of the sand bears N.E. b. N. from Beh castle.

In the middle of the channel, about S.E. from Carrickcheol rock, lies a rocky shoal, it has but 4 feet water on it, and is nearly half a cable's length from north to south. The mark to clear you on the north side is, the north point of Foyne's island; keep a boat's length without the high water mark of Ballinbochag point.

From Rimmylan point, nearly 2 cables' length north, lie the Bridge rocks, which dry at half ebb. To avoid them on the north side, keep the north point of Foyne's island on with Beh castle, or rather between the Castle and the high water mark of Ballinbochag point. Nearly half a mile eastward from Sod island there is a small rock which does not appear till 4 hours' ebb.

To sail up the channel from Ballinbochag point (which is the point next to the westward of Beh castle), to Sod island, give Ballinbochag point a berth of about 1½ cable's length, and when past Beh castle, keep the point of Foyne's island a boat's length open of Ballinbochag point, until you are nearly abreast of that rock, which lies next to the eastward of Carrikcheol; or until a remarkable white house on the north side of the river comes open on the east end of a green hill which is near the river and divided into enclosures; then keep the point of Foyne's island on with Beh castle until you are abreast of Sod island, to which give a cable's length berth, and steer for Kay island or a little to the southward of it. Many rocks and shoals lie between Kay island and the city of Limerick, particularly a little east of Bush island and the Whelps and Scarlets of Newtown point, which dry about three-quarters ebb. A beacon tower distinguishes the Scarlet rocks. From Key island to Limerick a pilot is quite requisite. The port of Limerick is a mile below the town, with two fathoms water, and a bottom of soft mud.

LIMERICK is situated about 60 miles up the Shannon: at this part of the river vessels of 300 tons may discharge their cargoes. The river is also navigable for barges and steam-boats for 150 miles further up, and communicates with the Grand and Royal canals to Dublin and Limerick; has a floating dock, the gates being 40 feet wide, and with 18 feet water.

Two miles above the Beeve rocks the channel of the Fergus turns to the north east. Although wide, is much encumbered with mud banks. Vessels may stop in the channel about half a mile or more southward of Inishtagman island, on 2 fathoms, the least water, or they lie aground in the channel above West Ing, well sheltered on soft mud. Small craft only can get up to Clare.

From Foyne's island to Limerick, spring tides rise 16 feet and neap tides 9 feet.

TIDES.—From Waterford to Loop head.—About 3 or 4 leagues without the Hook point of Waterford, the tide sets east and west. When it is half flood by the shore the tide begins to set east, and so continues for 6 hours; it then turns, and for the other 6 hours sets west.

On the east and north sides of Tuskar, the strongest spring tides run four miles an hour, and neap tides about 1½ mile. Near the Saltees the strongest

stream runs about two miles an hour; between the Saltees and Hook point it runs about one mile an hour; and at the Hook point three miles an hour. At this point a meeting of different streams makes a ripple or breaking of the water. Along the east side of the Hook point, the stream, from half flood on the shore to half ebb, runs to the northward; and from half ebb to half flood, it runs to the southward. On the west side of Hook point, and within a cable's length of the shore, the stream runs south from half flood to half ebb, and north from half ebb to half flood.

Between Hook point and Dundedy head, the principal stream of flood sets in from westward, and the ebb from the eastward; and 4 or 5 miles from shore, the strongest spring tides do not run above 1 mile in an hour, except near to the headlands westward of Kinsale, where they run, when strongest, about 3 miles an hour.

Between Dundedy head and Cape Clear, 1 mile from the shore, the strongest spring tides do not run more than one mile an hour, but near the headlands they run two miles in the same time.

The stream of flood continues to run along Mizen head for 2 hours later than to the eastward. The flood tide sets from the N.W. along the coast, west of Cape Clear, and the ebb from the S.E. In the offing, about a league from shore, the strongest spring tides do not run above one mile and a half an hour. Within a mile of Mizen head, the tide of ebb, or westward stream, runs 3½ miles an hour, and commonly makes a rough sea there. The tide of flood, or eastward stream, does not appear to be any rougher there than in other parts, unless the wind blows hard. In the bays, the stream of tide is scarcely sensible.

From Waterford to Cape Clear, the tide in the offing runs about three hours after high water on the shore.

From Cape Clear to Dursey island, it is high water on the shore, full and change days, at $3^h\ 45^m$; but along Mizen head the stream of ebb does not begin till two hours after, and three hours later at Dursey island. The flood tide sets in from the N.W. along this part of the coast. Off the coast, spring tides, when strongest, run not more than one mile an hour, except near the Bull and Cow rocks, where they run 3 miles an hour; and near Mizen head the stream of ebb runs 3½ miles an hour. Between Dursey island and Brea head, it is high water on the shore of the bays at $3^h\ 30^m$. The stream of flood which comes from the westward off this coast divides near the Skellig rocks into two branches, one of which runs northerly, and sets into the different bays in its way, whilst the other runs S.E. towards the Bull and Cow rocks. Between the Bull rock and Dursey island, spring tides run 3 miles an hour, neap tides one. In Dursey sound, the stream runs 4 miles an hour when strongest; in Kenmare river and the bays near it, it is scarcely perceptible. The stream in the offing does not shift till after half tide on the shore.

It is high water in Dingle bay, full and change days, at $3^h\ 30^m$; at the Blaskets, and from thence to the Shannon, at $3^h\ 45^m$. The stream of flood along the Blaskets sets in from the S.S.W., and the ebb from the N.N.E. In the Blasket sound, spring tides run 2 miles an hour; in Dingle bay, 1½ miles an hour, except at the mouth of Castlemain harbour, where it runs 2 miles an hour. From the Blaskets to the mouth of the Shannon the stream is scarcely perceptible.

SECTION XI.

THE COAST OF FRANCE FROM CALAIS TO THE CHANNEL ISLANDS.

VARIATION, 20° 45′ TO 22° 15′ W.

CALAIS lies 22½ miles S.E. ¼ S. from Dover. As you approach it from sea, it appears like an island, with some windmills and three principal steeples, one large, the other two smaller. From Grisnez it is distant about 12 miles, a little north of east. In sailing in with strong northerly and easterly winds, the harbour is somewhat dangerous. The entrance is open to the N. b. W.; it is nearly 90 yards wide, formed by wooden jetties open to admit a free passage for the current to run through them, so that vessels entering or leaving with strong winds at flood-tide are liable to be run against the east jetty. The time recommended for entering the harbour with the wind on shore is at high water; but with the wind off the land or across, is from half an hour to one hour before high water. Inside the jetty, the depths are from 8 to 13 feet at low water, but outside they decrease to 5 feet; spring tides rise 20 feet; neaps, 15 feet. A flag is hoisted on Fort Rouge, when there are 8 feet water in the harbour, during the day; and a bright tide light during the night; but not when the weather renders the harbour inaccessible. A red fixed light is shown all night on the western jetty, which may be seen at the distance of 2 miles; but in stormy weather it is not exhibited when access to the jetty is impracticable. A lighthouse is erected within the fortifications at the north-east side of the town; the light is 190 feet above the sea at high water, and is visible in clear weather at 21 miles' distance: it exhibits a brilliant fixed light, varied by bright flashes, every four minutes, which are preceded and followed by short eclipses, but not total when within 12 miles.

To the north westward of the harbour lies Calais road. The best anchorage is the great Steeple on with the westernmost Fort, and Cape Blancnez two sails' breadth open of Calais land; the ground is good for holding; mud mixed with gravel; depth, 12 and 14 fathoms, and sheltered by a sand bank, named Ridens de Calais, which begins a little to the westward of Fort Iapin, gradually lessening until it ends in a point off Fort de vert. On the western end are some spots of 3 fathoms.

Off **CAPE BLANCNEZ** are two banks, the Quenoes, being the outer one, lies from it N. b. W. 1¼ miles, with 6 feet water; the shoalest part of the inner bank, called Rouge Riden, is in the same direction from the Cape at ¾ mile distant, extending nearly 1½ miles in a line with the coast, and having from 6 to 12 feet depth; there is a good channel between them and the shore of from 4 to 7 fathoms, but great caution should be used in taking this passage. Blancnez is so called from its white appearance.

CAPE GRISNEZ lighthouse is 46 feet high from its base, and the light is 194 feet above high water; it shows a bright revolving light and is distinguished from the light at Calais, as it revolves and is eclipsed every half minute; it may be seen in clear weather at the distance of 22 miles. Cape Grisnez is a cliff of a

grey colour, projecting into the sea, and from its base a ledge stretches out about a quarter of a mile, which dries at low water. A flat extends in an E.N.E. direction from the Cape to the distance of 4 miles, at from 1 to 2 miles from the shore, with Banc de Ligne and Barriere rock on it; both these dry in parts at low springs, the latter being the further out is 1½ miles from the nearest shore, and not quite 3 miles from Cape Grisnez, with about the same distance from Cape Blancnez. The outer or northern edge of this flat is steep-to, and at springs the tide runs along it in the direction of the coast at the rate of 4 knots. Vessels may stop a tide near this flat in 10 or 15 fathoms, good ground. There are some patches of rock which dry at low water to the westward of Cape Blancnez, but the outer one, called des Gardes, is not more than half a mile from the shore.

From Cape Grisnez the east end of the Ridge bears N.W. ¼ N. 9½ miles, and the west end nearly W. b. N. 12 miles. Between the Ridge and the shore are from 20 to 30 fathoms, the deepest water being near the Ridge. You may stand towards the shore into 7 fathoms, without danger. Here, as at Dungeness, the North Sea and Channel tides meet.

From Cape Grisnez to the entrance of Boulogne is S.S.W. nearly 3 leagues. About a mile and a half to the southward of the Cape, in St. John's road, is an anchorage of 9 to 15 fathoms, where ships lie secure from E.N.E., East, and S.E. winds; but with the wind strong from S.W., West, or N.W., it is dangerous; and as the ground for about a quarter of a mile from the shore is foul and rocky, be careful not to come within that distance, nor into less than 9 or 10 fathoms. Between this road and a point to the westward of Boulogne are several sunken rocks, some of which lie nearly half a mile from shore.

BOULOGNE.—The town of Boulogne is divided into the upper and lower town; the latter is called Boulogne-sur-Mer. The harbour has been considerably improved. The basin has been so enlarged that it is now capable of holding several hundred of small vessels. The general direction of the entrance is S.S.E. ¼ E.; it is bounded by two jetties; the one to the westward is solid up to the level of high water; it is thrown out to the length of 2200 feet, and follows the line of the rocky shore. The other to the eastward extends directly out, and the bottom of the intervening channel is 230 feet in width. The great object in the improvements was to make Boulogne a harbour of refuge for ships surprised by bad weather in the channel; and it has been noticed in the construction of the jetties, every thing has been done to facilitate the movements of the vessels; and the system of signals, both by day and night, have been made as perfect as possible. The entrance is now so easy that captains who have been once in take no pilots even at night; and yet since 1834, when the old entrance was entirely annulled, not a single disaster has occured. The harbour is, therefore, considered as one of the safest and easiest in the channel.

On the south-western jetty, at the watch-house (Musoir), two lights are shown, one above the other, elevated respectively 33 and 43 feet above high water; the upper one whilst there are 10 feet depth in the channel; the lower lantern is lighted at high water, when also a red light is exhibited on the north-east jetty; all three are kept lighted only until the water again falls to 10 feet depth; the red light may be seen at 1½ miles, and the other two at 5 or 6 miles' distance. A red flag is shown by day on the the south-western jetty at the same time of tide that the lights are. In other states of the tide it is prudent not to make for the port, except with a pilot of the place. It is high water on full and change of the moon at half-past 11; ordinary spring tides rise 25 feet; neap tides 19 feet.

Vessels making for the harbour will, therefore, have the red light on the port hand, and the tide lights on the starboard. When the wind is S.S.W. or S.W. the vessels must be kept to the windward of the entrance, in order to make the watch-house (Musoir), and come as close to it as possible on account of the current, which sets at the extremity of the jetty in a northerly direction, and at the rate of about from 4 to 5 knots. It is equally important to remember that the watch-house (Musoir) of the south-western jetty projects into the sea 588 feet beyond the extremity of the north-eastern stockade, and the breadth of the channel in the deepest part at the entrance is 230 feet. To render the watch-

house of the S.W. jetty more easily discernible, all the parts above the high tides are painted bright yellow. In the high equinoctial spring tides there are 28 feet of water in the channel, and in the neap tides only 21 feet. The passage is perfectly free and clear, and vessels may come a-ground without peril in the channel. Ships may anchor in from 6 to 9 fathoms off the harbour, at the distance of about three-quarters of a mile from the shore. About 3 miles without the harbour's mouth there lies a bank, called the Bassure de Baas; it stretches from Ambleteuse, in a curve to the S.S.W. and S.W. 24 miles. It is about half a mile broad, and has generally from 4 to 7 fathoms on it. The shoalest part of this bank has only 17 feet; it lies with the entrance of Boulogne S.S.E., distant 3 miles. Close to this bank on each side are 11 and 14 fathoms.

On the north of the town, on a hill, is placed the column of Napoleon: it stands about three-quarters of a mile out of the town. The height of the column is about 160 feet, and the statue of Napoleon, which surmounts it, 16 feet.

At 2¼ miles S.W. of Boulogne is Point Alprec. Near the old semaphore is shown a fixed light, with a red flash every two minutes, which is preceded and followed by a short eclipse; it is 160 feet above high water, and may be seen at 4 leagues distant.

ETAPLES, at the entrance of the river Canche, is about 4 leagues from Boulogne; the banks at the entrance shift so frequently that no description can be of any avail. The harbour dries at low water. The harbour light may be seen at the distance of 2 leagues: the light is a fixed one, and on the north side of the harbour, at Point de Lornel. On the south side of the harbour, on Trouquet point, are two other lights, 174 feet above high water, standing apart from each other distant from the north light half a league, and visible at 6 leagues' distance.

On the northern side of the mouth of the river Authie, on the Point de Berck, or de Haut banc, stands a fixed light, elevated 65 feet above the level of the sea at high water, and may be seen at the distance of 3 leagues.

The town and harbour of St. Valery lies at the entrance of the river Somme, being about 6 leagues from Etaples. It is capable of receiving merchant vessels; but is difficult to enter in consequence of a sand-bank barring up the entrance, on which the tide rises, only 8 or 9 feet, although the rise of tide outside is from 25 to 30 feet. The passage, which is intricate, is generally buoyed.

At CAYEUX, on the south side of the entrance into the Somme, is a tower, exhibiting a light elevated 91 feet above high water, which is intermitting, or varied by flashes. These flashes, having a duration of from 8 to 10 seconds, succeed each other every 4 minutes. The faint light, seen during the intervals, is preceded and followed by very short eclipses. In clear weather the flashes may be seen 5 leagues off. A tide light 656 yards S.W. of Cayeux light is shown to point out the south channel of the Somme; it is lighted at 3½ hours after the beginning of the flood and put out 1½ hours after the beginning of the ebb. Two harbour fixed lights are placed one on the north, the other on the south side of the entrance to the river; they may be seen at 4 miles off.

At the entrance it is high water, on full and change days, at $10^h\ 30^m$. To the west of the lighthouse, vessels bound into the harbour generally anchor in 5 or 6 fathoms, good ground. The flood tide runs in the offing until 11 o'clock, and the stream sets about E.N.E.

Off the coast, at unequal distances from the land, between Etaples and St. Valery, on the river Somme, lie three long banks, namely, the Batteur, Quemur, and Bassurelle, in a N.E. and S.W. direction, nearly parallel with each other; neither of them is dangerous, the depth over them, from 6 to 8 fathoms, being nearly equal. Between are from 10 to 20 fathoms, guadual soundings. The Batteur is the outer one: it lies 10 miles from the land; the middle one is the Quemur; and the inner one the Bassurelle. The latter is 6 miles in length, extending directly athwart the entrance of the Somme, at the distance of 5 miles. The soundings upon it are grey sand and broken shells. At the inner edge of the Bassurelle are 8 fathoms, and as you approach the Somme river, the water shallows to 5, 4, 3, and 2 fathoms.

Treport lies about 3 leagues from the entrance of the River Somme. On the

western jetty there is a steady tide light, elevated 36 feet above the sea, and may be discerned 3 leagues off in clear weather. This harbour is only fit for small coasting vessels. Between Treport and the river Somme the shore is flat and the soundings irregular; so that, in many places, only 18 feet will be found 3 miles from the beach, and you will as suddenly drop into 6 and 8 fathoms. There are also several rocky ledges along the shore in this neighbourhood. When bound in to the river Somme, therefore, keep the light on Point de l'Ailly in a W.S.W. ½ W. direction, which will lead without these dangers directly to the entrance of that river, and you will obtain sight of the light at St. Valery en Caux on losing sight of that on Point de l'Ailly, or nearly so.

The tide here, both ebb and flood, runs along the land, so that there is little or no offset at any time.

There is a ledge of rocks about 3½ miles from Treport W. b. N. and 2 miles from shore, and having only 7 or 8 feet at low water. To the westward, nearly 4½ leagues from Treport, is the road, where ships anchor, waiting for the tide to run into Dieppe. The ground is good in 6 or 7 fathoms, well sheltered from easterly and southerly winds, but exposed to all others.

DIEPPE.—From the river Somme to Dieppe the coast trends in a W.S.W. direction about 7½ leagues. Dieppe is situated in a valley between two cliffs. When you are coming in from the sea you discover two high steeples and a large castle, which stands to the westward of the town. On the north-east side of the town are the suburbs of Paulet and the two stone jetties, betwixt which lies the entrance of the harbour. This harbour is rendered very difficult of access by the rapidity of the current, both inwards and outwards. As soon as you have anchored in the road of Dieppe you are visited by the pilots, and a signal is made on shore when it is thought proper for you to enter the harbour. If you should happen to stay until the ebb makes out, the rapidity of the current would make an attempt to enter extremely hazardous, if not impossible. In the harbour, vessels lie at the quay well sheltered from all winds.

On the western side of the entrance to the harbour, a bright fixed light is exhibited from a tower 39 feet above high water, visible at 10 miles distance, but kept lighted only while there are 10½ feet at the entrance of the channel. On the eastern mole are three lanterns attached to a mast; one is kept lighted all night 23 feet above high water; a second, elevated eight feet above it, is lighted from 2½ before till 2 hours after high water, and a third shown between the two at 2 hours before high water, and at high water is extinguished. The two latter are not lighted when the weather prevents access to the port. For the guidance of vessels, the mast which supports the lights is kept vertical while the vessel preserves her proper course, but should she deviate, the mast is inclined to that side towards which she ought to steer. Vessels desirous of profiting by these signals, should show two lights, one forward and one aft. The tides flow here at half-past 10 o'clock, and rise 19 feet.

Cape de l'Ailly lies about 4½ miles to the westward of Dieppe, upon which is erected a revolving light, the eclipses succeeding each other at an interval of one minute; the light being elevated 306 feet above the level of the sea, may be seen in clear weather at the distance of 9 leagues. Off this point the ground is foul to the distance of 2 miles from the shore; at the distance of half a mile from thence you may get 13 fathoms; by keeping, therefore, in not less than 14 fathoms you avoid all danger.

St Valery en Caux lies about 10 miles W. b. N. from Cape l'Ailly; the ground between them is foul. Towards St. Valery, the shore is cliffy, over which many woods and steeples may be seen. The cliff has two openings, with two villages; in the third opening appears St. Valery, with a small harbour which dries at low water; near the end of the west jetty is a tide light, which denotes a depth of not less than 8 feet at the end of the jetty.

FECAMP lies about 5 leagues W. ¼ N. from St. Valery. Between these two places, the high white cliffs continue, with three valleys between, almost down to the shore. The town may be known by a large church on the north-east side, on the edge of the coast; it is situated in a broad valley. It is easy of access, unless

with a fresh wind from the west or south-west. It has two roadsteads: the Great road lies about 2 miles from the shore opposite to Criquebœuf; good holding ground, clay and sand, with 13 fathoms' depth. The Little road has from 10 to 7 fathoms, and lies on the western side of the harbour. Upon a tower erected on the Monte de la Vierge, on the left of the entrance of the port of Fecamp, is a lighthouse with a brilliant fixed light, 427 feet above the level of high water, and may be seen at the distance of 6 leagues.

At the northern jetty, and at the foot of the Monte de la Vierge, there is a tide light, which is only lighted when there are 10 feet or more water at the entrance of the harbour; it flashes once in 3 minutes.

On any part of the coast between St. Velery and Fecamp, there being good anchorage, vessels may stop a tide.

Off Cape Antifer there are some sharp-pointed rocks called Les Aiguilles, but they are close to the shore and bold close-to; the middle one is covered at high water.

It is of great importance that vessels in their progress up Channel, who are desirous of keeping the French shore on board, should consider attentively the relative positions of the several lighthouses; for in like manner as the three lights on the Casquets will in many situations appear but as two, so the lights on Cape la Hève, if fallen in with in a S.W. direction, will show as one, being of equal height. The lights on Cape Barfleur and Point de l'Ailly are each revolving, but in this case no misconception can arise, as the intervals are very different, and as on similar bearings, and at equal distances, the difference in the soundings amounts to no less than 10 fathoms. The lighthouses on Cape La Hève are of equal height, but so placed as not to appear in a line by any vessel from the N., N.W., and W., in order that no vessel shall mistake them for either l'Ailly or Cape Barfleur, which stand singly. The southern tower stands 50 fathoms from the edge of the cliff, and the other bears from it N.E. and distant 34 fathoms. The lights are fixed and very brilliant, 397 feet above the level of high water, so that they may be seen at the distance of 7 leagues. When navigating at the mouth of the Seine do not attempt to bring the lights in one until 4 hours' flood. At about one mile W.S.W. from the Cape there is a ledge of rocks called l'Eclat, on which, at ebb tide, there is no more than 7 or 8 feet water.

HAVRE lies 2¼ miles S.S.E. from Cape la Hève: the land all the way between is low, with numerous windmills. This port is at the mouth of the river Seine, and is properly the sea-port of Paris. The harbour, which lies within the walls of the town, extends east and west. The entrance is formed by two stone piers, on each of which is a tower. The longest jetty is on the western side; at the end of which is a superior harbour light, elevated 39 feet, and visible 3 leagues off. A second fixed light is shown on the S.E. pier, of an orange colour visible at one mile off.

In this harbour the water does not perceptibly ebb till three hours after high water: in consequence of this peculiarity, fleets of 120 sail have often left it in one tide, and even with the wind against them. This uncommon effect is generally ascribed to the Seine, whose current, when the sea begins to ebb, crosses the pier-heads with such force as to prevent the water in the harbour from running out, until the water without has fallen to a certain degree below it, which generally happens about three hours after high water.

It has been remarked that, in this part, at about the full and change of the moon, the currents are so strong, and the winds so high, that ships which happen to be in the roads are in danger of being lost in the mouth of the river, or driven against the coast.

It is recommended to all who are bound into the port to take a pilot, as they are always attending for that purpose, commonly as far off as Cape Barfleur, unless the weather be so bad that they cannot get off; in that case go the north side of the entrance and make signals, by which you may know when you may safely enter the harbour; in doing which, take care to keep it always open, so as to see all the ships in it between the two towers; and thus steer in, passing nearer to the great tower on the port than to the little one on the starboard side.

There are two roadsteads without the entrance of the river: the Great road, which is a league and a half from the harbour, is three miles in extent from north to south, lying west from Cape la Hève; and the Little road, lying to the southward of the cape, half a league from the harbour. The two roads are separated by banks called the High Grounds of the road and the Eclat bank; the Little road being within, and the Great one without, these banks.

In the Outer road are 9 and 10 fathoms at low water. The inner one extends about three-quarters of a mile every way. Its bottom is clay and good ground, but so covered with pebbles and oysters, that ships which lie only one tide generally moor, to avoid damaging the cables. Ships waiting for a tide, will, therefore, always prefer the outer to the inner road.

The best anchorage is a league to the west of La Hève, on oazy ground, in about 10 fathoms at low water, with the Castle of Orcher (on a steep cliff 3 leagues to the eastward of Havre) a little open of Ingouville land to the northward of Havre. In bad weather a vessel may lie here moored north and south with two anchors.

Here the flood tide sets as follow; the first two hours, south; the next two hours, south-east; the fifth hour, east; and during the remainder of the tide, it sets from N.E. to N.W.

Should it be required to go into the Little road at low water, either to wait for a tide or pilot, and should the wind permit, steer up between La Hève and l'Eclat, keeping the guard-house that stands on the Jetty of Havre, S.S.E. ½ E. in a line with the chapel, called Notre Dame de Grace, that stands a little to the westward of Honfleur. Continue in this direction until the coast to the northward of La Hève is shut in with that cape. Proceed next on a south course until half-way between La Hève and Havre, where you may anchor in from 3 to 4 fathoms at low water, but in danger of having the cables injured as before mentioned.

If a wind prevailing from between S.S.W. and W.S.W., should prevent a vessel's going within l'Eclat from the Great rock, she may sail in to the southward, between l'Eclat and the Bank les Hauts, by keeping the castle of Orcher in one with the two towers of the gate of Ingouville, which appears joining to the northern part of the town, and steering thus until the land northward of Cape la Hève be shut in with the cape, as before described.

In any part of the channel within l'Eclat, vessels may anchor for a tide in from 3 to 4 fathoms.

Signals at Havre. By a regulation established in 1829, black balls, varying in position and number, are exhibited on a mast and yard, erected upon the N.W. jetty of Havre, to denote the depth of water, in French feet, which there was in the channel into the port during the previous tide, and which is made known by the following arrangement:—

One ball, at either yard-arm, denotes 11 feet; two balls, one at each yard-arm, 12 feet; three balls, one at each yard-arm and one half-mast high, 13 feet.

One ball, at the mast head, 14 feet; two balls, one at the mast-head and one at either-yard arm, 15 feet; three balls, one at the mast-head and one at each yard-arm, 16 feet; four balls, one at the mast-head on half-mast high, and one at each yard-arm 17 feet.

One ball at the mast-head and a pendant over it, 18 feet; two balls, one at the mast-head, with a pendant over it, and a ball at either yard-arm, 19 feet; three balls, one at the mast-head with a pendant over it, and one ball at each yard-arm, 20 feet; four balls, one at the mast-head with a pendant over it, one ball at each yard-arm, and one ball half-mast high, 21 feet.

The addition of 6 inches is shown by a pendant at one of the yard-arms.

These signals may be distinguished, with a common telescope, at the distance of a league, or a league and a half from the harbour.

Harfleur lies about three miles to the eastward of Havre on the north side of the river. On the Pointe du Hoc, there is a harbour light, elevated 39 feet above high water, and may be seen at the distance of three leagues. The light is a stationary one. There are also two small leading lights. By keeping them in a line you avoid the rocks in entering the port.

Honfleur lies on the south side of the river Seine, about 2 leagues from Havre,

and has a small harbour and basin. In the river between them are several extensive shifting banks, the principal one of which is Amfar. This bank is about 6 miles in length and half a mile in breadth, extending nearly E.S.E. and W.S.W. Its west end lies about S.W. by S. from Havre, distant 1 mile: the other banks lie more to the southward. The west end of one of them, called Ratier, lies N.W. b. W. about 5 miles. Both these banks partially dry at low water. There are several banks, which dry at low water, between the little river of Touque and Ratier; between these and the land, as also between them and Amfar, there are passages; but those unacquainted would, of course, not attempt them without a pilot, as the danger of the banks is considerably increased by the rapidity of the tides. The great bank which lies to the northward of this river is called the Trouville; it lies in the direction of the coast, and dries nearly to the extent of a league.

Two fixed lights at Honfleur, for the tide and channel, are elevated 32 and 29 feet; the western and highest is on the hospital jetty, at the N.W. extremity of the town, and the eastern on the quay north of the new basin. Seen at 3 to 3½ leagues. At the mouth of Touque river, 7½ miles south-westward from Honfleur, are two fixed lights on the western side of the entrance, at the distance of 155 yards from each other. The lower is a tide-light, seen 2 leagues off, kept in while there is a depth of 7 or more feet of water at the entrance; the upper light is permanent, and 32 feet above high water. The lights in one give the direction of the passage inward. Seen between two and three leagues off.

The small harbour of Dive lies about 12 miles from Honfleur. Between these places the land is high, but may be distinguished by having three valleys between them. From Dive to the westward of Orne are sandy downs: it may be known from three steeples being at the extremity. To the N.W. point of Orne, about 2 leagues, are some rocks, called the Shars de Langrune: they are about 2 miles from shore. The Lions, equally dangerous, lie between. The rocks of Calvados, further to the westward, stretch along the shore for about 2 leagues, partially uncovering at spring tides. There being 8 to 9 fathoms close to them, you should not approach nearer than 10 or 12 fathoms, and at 3 or 4 miles off shore.

There at two harbour lights at the river Orne, both fixed and stationary; these are situated on the west side of the entrance, and bear N. 24° E. and S. 24° W. (nearly N.E. and S.W. by compass), from each other, distant 3,600 feet. The outer light stands on the Denes, near the redoubt of Oyestreham; its elevation is 39 feet 4 inches, and may be seen 8 or 9 miles off in clear weather: the inner light is placed upon the church of Oyestreham, 91 feet 9 inches high, and visible 4 leagues. These two lights brought in one lead directly into the channel.

From the river Orne to the harbour of Isigny the land is of sufficient height to be seen 6 or 7 leagues off.

Courseulles lies about 9 or 10 miles westward of the river Orne: it is a small harbour between two jetties. On the western one is shown a fixed light, elevated 30 feet above spring tides, so that it may be seen at the distance of 2 leagues.

Pointe de Ver lies about 2 miles to the westward of Courseulles; here a lighthouse, 137 feet above the level of spring tides, in fine weather, may be seen at the distance of 5 leagues; it is a flashing light; the flashes succeed each other every 4 minutes, lasting from 8 to 10 seconds. The least light, seen in the intervals between the flashes, is preceded and followed by short eclipses.

Port en Bessin is a small fishing town, about 9½ miles from Pointe de Ver, and nearly 5 to the eastward of Isigny. Two lofty woods, appearing like hummocks, distinguish this part of the coast. Grand Champ, another fishing village, lies about 4 leagues to the westward. At both places are temporary lights for the use of the fishermen; that of Port en Bessin, during bad weather, only from September to April. They may be seen at the distance of 1 league. Two tide lights are also shown at Port Isigny.

The small islands of St. Marcon lies W.N.W. from Cape la Hève 16 leagues, and 5¾ W. from Cape Barfleur about 4 leagues; they are of moderate height; a vessel may sail around them as well as anchor between. A long sand stretches

out from each end; that on the south for 6 miles, having on it from 2 to 5 fathoms; the other towards the north-west for between 4 and 5 miles, having from 3 to 4 fathoms. A fixed light is shown from the tower of St. Marcouf 56 feet above the level of the sea, which may be seen at the distance of 3 leagues in clear weather. Half way between Cape Barfleur and the isles of St. Marcouf, and 4 miles from the coast, lies Banc de Fer, with 2 fathoms on it. It lies about E. ¾ S. 4½ miles from the Isle of Tatihou, and is 4 miles from the nearest part of the coast.

Between Cherbourg and Cape Barfleur, where there is an excellent light, which revolves every half minute, the coast is infested with rocks, close to which 15 fathoms will be found; in thick weather, therefore, no ship should approach nearer than 26 fathoms, which is not more than 2 miles from the projecting rocks. During spring tides, the sea about Cape Barfleur exhibits a continued sheet of broken water, from their rapidity, sometimes almost six knots, and is from thence called the Race of Barfleur.

The course from any position off the Casquets to a similar position off Cape Barfleur is S.E. b. E. ¾ E., and the distance 15 leagues; and from thence to another similar position off Cape Antifer, 18 leagues more on the same course. In running, however, from the Casquets towards Cape Barfleur, attention must be paid to the tides; as, between half-ebb and half-flood, the indraught of the Channel Islands is in operation.

To the south-eastward of the lighthouse is the small harbour of Barfleur, which dries at low water, and fit for vessels drawing only 10 feet: it may be readily entered by keeping in mid-channel. On entering the harbour on the port hand are two small lights, which, kept in a line, denote the passage in. They may be seen at the distance of 2 leagues.

It may be useful here to remark, that vessels coming from the northward for Havre will see the revolving light of Cape l'Ailly, which, in fine weather, can be kept in sight until the fixed light of La Hève appears; as also that, in going down channel, you will not long lose the sight of La Hève before that of Barfleur is seen; and ships coming from sea for Havre, after passing the Caskets, will presently see that of Barfleur.

The lighthouses on La Hève being N.E. and S.W. by compass, ships to the northward can never see them in a line; for if you see a single light to the southward, without having previously seen the land, it cannot be otherwise than that of Barfleur or l'Ailly; it would, therefore, be dangerous to continue your course without sounding.

From the land, the water is deeper near Barfleur than l'Ailly. From the N. to N.W. of Barfleur, at 5 or 6 leagues distance, there is between 35 and 40 fathoms, with coarse ground; at 3 leagues off, from 28 to 30 fathoms, coarse gravel; and 20 to 22 fathoms, very near the shore, coarse brown sand; whereas, off l'Ailly, from N.W. to N.E. from the lighthouse 5 or 6 leagues, are from 20 to 24 fathoms, mixed ground, shells, gravel, pebbles of different colours, and reddish rock. Nearer to the shore, from 2 to 4 leagues, you get the same description of bottom, but only from 18 to 20 fathoms.

A ship from the westward should not come nearer Barfleur than 20 to 22 fathoms; but if bound to the Seine, after seeing the lights of La Hève, should wait for the tide, not approaching nearer than 14 or 15 fathoms. Towards Barfleur from the Seine keep your soundings about 16 and 20 fathoms, the ground small pebbles, with very little sand, steering N.W. ¾ N.

To the southward of Cape Barfleur, about 7 or 8 miles, is the small harbour of La Hogue. It is sheltered on all sides, except from E.S.E. to S.S.E., and is capable of admitting ships drawing 12 or 14 feet water. The passage in easy, but best on the north side, as on the south are several rocks. It dries at low water. The ground is clay. The road of La Hogue lies to the southward of the harbour, where ships may ride in from 5 to 9 fathoms: sand and clay: secure from all winds if the ground tackle is good. the tide flows at full and change till three-quarters past eight o'clock, the water having a rise of 16 feet.

There are three lights for the Road of La Hogue: on the redoubt of Reville, on the mound of Morsaline, and on the southern extremity of the fort of La Hogue.

The official notice of these lights adds the following instructions for entering the Roads and Port of La Hogue:—

The Reville light in one with the intermittent light on Cape Barfleur, gives a line which must not be crossed to the westward by vessels working at night to the southward when abreast of the isle Tatihou.

The lights of Morsaline and Fort La Hogue, when in one, indicate the northern limit of the channel by which large vessels should enter the road; and this line of direction just touches the southern side of the shoalest of the Ouest Drix rocks, over which there are only 14 feet at low water spring tides.

In order to approach the anchorage, in a large merchant vessel, it is necessary, when proceeding from the point where the two lines of direction, above-mentioned, cross each other, so to steer as always to keep Fort La Hogue light some degrees open to the northward of Morsaline light, which is readily distinguished from that of La Hogue by being much higher.

A ship of the line, having reached the point where the above-mentioned two lines of direction intersect each other, may steer W.S.W. for the anchorage in the Great road. On this track it passes between the flat of the Ouest Drix and the north point of the Banc du Bec.

There is reported to be a sunken rock to lie E.N.E. of the lighthouse of Cape Barfleur about 6 miles.

CAPE LEVI lies about 8 miles to the westward of Cape Barfleur. A light, 115 feet above high water, stands on Cape Levi, showing a red flash every three minutes. The ground between these capes is very foul, so that vessels should not anchor in less than 22 fathoms; you will then be about 2½ miles from shore. The Grand Renier rock lies about 4½ miles to the southward of east, and a bank, with 5 or 6 fathoms on it, lies to the northward of east of it. A rock, called La Pierre Noire, lies about the meridian of Cape Levi, rather more than a mile, with a shoal to the south side, and a sunken rock on the northern side. Close around the Pierre Noire and the shoal there is from 5 to 6 fathoms; the shoal has only 10 feet water on it.

The mountain above Cherbourg well open above Cape Levi, will lead considerably north of the dangers which lie to the eastward of Cape Levi.

On the western side of Cape Levi is a small cove with good anchorage, in 6 or 7 fathoms, sandy ground.

CHERBOURG lies nearly 7 miles W. ½ S. from Cape Levi. The road is formed by a breakwater or mole, 2 miles long, founded on sunken cones, rendering this a secure station for line-of-battle ships. At each end of this mole is a passage of half a mile wide, and near to its centre a fort, called Fort Central, on which is a tower exhibiting a fixed flashing light, at intervals of three minutes. Each flash will last 4 or 5 seconds, and will be followed by a short eclipse; a faint light will then appear for 2¾ minutes, and after another short eclipse there will be another flash, &c. This light is 65 feet above the level of high water, at spring-tides, and will be visible in clear weather, at the distance of 3 leagues.

Two miles E.N.E. ¼ E. from the town of Cherbourg, lies the rocky island called Isle Pelee. Two heads of this isle are always above water, and upon one of these is fort Imperial, from which a light is shown, which is intended to serve as a guide to vessels entering between the island and the east end of the dike. There is no passing betwixt it and the land, except at high water, and then only with small vessels; but it may be safely passed on the side next the sea in 5 or 6 fathoms.

The ROAD OF CHERBOURG lies directly before the town; the best anchorage is along the southern side of the mole or dike, in 8 or 9 fathoms, at low water. The bottom being fine sand, is good for holding. From the Isle Pelee to point Querqueville, the distance is about 4 miles; and between is the before-mentioned dike or mole. The N.E. entrance is protected by the fort on Pelee, and the N.W.

by another on Querqueville. A fixed light has been established on point Querqueville to direct a vessel entering by the western passage; by keeping the light S.W. b. W ½ W., until Pelee light appears in a line, when she will be in the direction of the Mole head, and may thence round to the eastward into the harbour. The water rises in the harbour, on full and change days, about 20 feet.

When approaching Cherbourg, in clear weather, there will be seen at the same time the revolving light on fort Central, the fixed light of Querqueville, the fixed light at Pelee isle, a green fixed light on the eastern end of the breakwater, and a red fixed light on the western head; but from their different characters and positions, there will be no danger of mistaking them.

SECTION XII.

THE COAST OF FRANCE FROM CAPE LA HAGUE TO USHANT, WITH THE CHANNEL ISLANDS.

VARIATION FROM 22° TO 23° W.

CAPE LA HAGUE, the north-western point of Normandy, is low and sandy, but rises gradually towards the interior. It is skirted by many dangerous rocks on both sides, as well as off its pitch, and breakers may be seen extending nearly a mile from the strand. Of these, the sunken rocks called Senequet d'Amont are the farthest off to the northward—they have as little as 26 feet upon them, with 10 fathoms close-to—the mark for which is the house on Burhou island just open to the northward of the northernmost point in Alderney, point Grois.

It has been already stated that Cape la Hague is a low sandy point, but at the distance of 3 miles S.S.W., the coast rises suddenly into a high bluff promontory called Jobourg-nez. There is a bright fixed light on a rock off Cape la Hague, and a revolving light on Cape Carteret.

The dangerous rocks which skirt Cape la Hague, as well to the westward as to the northward, and the breakers, which may be discerned almost a mile from the shore, will render it prudent for a stranger never to shut in Cape Roselle with Cape Flamanville, unless Ortach, or the Casquets, are open to the northward of Alderney; particularly on a north-eastern stream of tide and a westerly wind. With easterly winds, Cape Carteret guard-house may be substituted for Cape Roselle, if clear of les Trepieds. He should endeavour, as near as may be, to keep the middle of the passage.

JOBOURG-NEZ forms the northern boundary of the great bight called Anse de Vauville, as Cape Flamanville does the southern boundary. This bay affords good shelter against all winds that blow from between south and north-east, in from 4 to 12 fathoms water, a bottom of fine hard sand, and the only dangers to be feared are les Trepieds, or Huquets. These rocks may be avoided on the western side by keeping Cape Carteret in sight to the westward of Cape Flamanville, or Cape la Hague open westward of Jobourg-nez. As two small rocky knolls, however, have been discovered half a mile to the north-westward of les Trepieds, with only 7 and 20 feet on each respectively, it will be prudent, when going through the Race, not to shut in Cape Roselle until clear of the Trepieds, nor to bring Cape la Hague light, during the night, more northerly than N.E. ½ N., unless within an hour of high water.

The little port of Dielette lies in the southern part of this bight, about 2 miles from Cape Flamanville. It is best not to anchor within two miles of the beach at low water.

CAPE FLAMANVILLE is a high bluff point, lying S. ¾ W., 8¾ miles from Jobourg-nez. Cape Roselle is about 3½ miles, S. ¼ E., from Cape Flamanville, and Cape Carteret about 6 miles from the former, S. b. W. Between Cape Flamanville and Cape Carteret the land near the shore is high and appears

double; and from thence to Regneville it is altogether as low, rising again towards Granville. Coutances cathedral, about 6 miles inland, is lofty, and rendered remarkable by its two spires or turrets, which occasionally appear like the Reculvers in Kent. There do not appear to be any hidden dangers in the offing between Cape Flamanville and Cape Carteret, except les Trois Grunes; but from the broad sandy beach between those capes, shallow water extends to the distance of nearly 1½ miles. The most prominent parts of these shallows are a ridge or shoal, called les Roches du Rit, between Baubigny and the Cape, but nearest the latter, which dries at low water great spring tides, and the Bancs de Surtainville, which break at that period.

Les TROIS GRUNES is a dangerous rocky ledge, lying about 3¾ miles from Cape Carteret, in the direction of W.N.W.: it is about 2 miles in length and 1 mile in breadth, trending north-westerly and south-easterly, and appears at low water great spring tides.

The ECREHOU ROCKS lie to the southward of the Trois Grunes, and between the north-eastern point of Jersey and Cape Carteret, at nearly equal distances from both. There are a few scattered huts on the Maitre isle and Marmotier (the two largest), to which the natives of Jersey resort during the fishing season. From the south-eastern end of l'Ecrevier bank to the western end of les Dirouilles this ledge occupies a space of 9 miles.

The ECREVIERE BANK extends from l'Ecreviere rock in nearly a south-easterly direction, and to the distance of nearly 3½ miles; and, at low water equinoctial tides, dries in several different places. Rond-nez point shut in with Bellehogue point, or Boulez guardhouse in one with Tour de Roselle, N.W. b. W. ½ W., will carry you to the south-westward thereof; and when the Marmotier houses appear twice their own breadth open to the north-eastward of le Bigorne N.W. ¼ N., you are to the eastward of its south-east extreme.

The Bigorne is a remarkable horned rock, about half a mile to the south-eastward of the Marmotier, and never covers.

Nearly midway between the Ecrehou rocks and Cape Carteret is a ridge of coarse sand and shingle, called les Bancs Félés, which dries in three places at low water great spring tides. It extends south-easterly upwards of 5 miles. It is half a mile wide, and remarkably steep, both on its eastern and western sides. Pleinmont point (Jersey) open to the southward of the Maitre isle, W.N.W. ½ W., and a remarkable square green patch in the white sands, or Dunes, de Hatainville in one with the pitch of Cape Carteret, are the marks for the southern extreme of this bank, and Montorgueil castle in one with the Maitre isle S. W. b. W. ¼ W., is the mark for the northern part thereof.

There is a channel between the Félés banks and the Ecrehous, and also between it and the French coast: the water is much deeper in the former than in the latter, but the last is the usual passage, and is to be preferred to the first.

Cape Flamanville in sight to the westward of Cape Carteret, N. ½ E., will lead over the south-eastern tail of the Bancs Félés; but it must be gradually opened out as you proceed to the southward for the same reason. Cape Roselle in sight to the westward of Cape Carteret will lead nearly midway between le Bœuf and the foul ground westward of le Senequet; but Cape Roselle is not always well defined, being confused with the land behind it.

When in the vicinity of Bœuf and the Senequet you will, as you advance to the southward, see the bluff point 6 miles to the southward of Granville, called le Bec de Champeaux, which is to be kept just in sight to the westward of the high land whereon Granville stands, S. ¼ W.; this will lead between la Mariée and le Ronquet rocks, and also clear of all danger, until nearly as far as la Catheue; whence, if you intend to pass between the Chausey islands and Granville, you must look out for the remarkable Trees which stand on Mount Huchon, about 2 miles to the north of Coutances, and not bring them in one with Agon church until la Petite Canue at Chausey appears in one with les Huguenans about S.S.W.; this latter mark will lead you to the westward of la Catheue, a dangerous reef upon the northern extremity of les Bancs de Montmartin, some of which shew themselves at low water. To the westward of the Bancs de Montmartin

the water deepens to 5 fathoms; and when the Point de la Tour opens to the southward of les Huguenans, N.W. b. W. ¾ W., you must haul up for it, in order to avoid the Banc Haguet, or anchor to wait for water, if bound into Granville. At the early period of two hours' flood, there will be 11 feet water over la Catheue, le Founet, and les Bancs de Montmartin. Le Founet is the most eastern rock of the group at Chausey, and shews a little before low water.

GRANVILLE.—The navigation in the vicinity of Granville at the period of low water is very difficult and dangerous, in consequence of the numerous banks and knolls of sand which bar its approaches. There are twenty-two of these banks in all. When bound into Granville, bring the Magazine which stands on the south-east end of the new Mole in one with the east end of the Garrison wall, and giving the Mole head, when rounding it, a berth of a ship's length only. A vessel drawing 10 feet water must not attempt to round the Mole head until four hours' flood.

Le Loup rock, on which there is a pole, covers at half flood, at which period there are not more than 14 feet at the New Mole head, nor more than 6 feet within it. Le Cocaleux is a small bank of sand and gravel, about 1½ miles to the north-west of the lighthouse, and dries at low water; between it and the lighthouse there are several small rocky heads, three of which occasionally dry. Between le Cocaleux and le Tombelaine there are 3 fathoms at low water.

The lighthouse stands on the extreme western end of Granville peninsula, and may be seen, in clear weather, three or four leagues. There is also a red light on the New Mole head at the west side of the entrance.

Le Banc de Rondehaye lies nearly in the centre of Cancale bay, on the north-western end of which there is a rock with only 8 feet water upon it, and there is still less water on its south-eastern part.

Le Banc Breton lies in the heart of the bay, between Cancale and Champeaux, on the shoalest part of which there are only 6 feet water.

The roadsteads most free from the irregularities with which the ground along this coast abounds, are those of the Anse de Vauville; Ciotat, Port Bail, St. Germain, and Regneville; but the three latter can be used by small vessels only, as there are not more than 2½ or 3 fathoms in either at low water. At Regneville, on Agon point, is a fixed light, visible at the distance of ten miles.

Between Granville and le Grand Herpin, Cancale bay makes a deep bight, nearly in the head whereof stands the remarkable insulated and lofty rock called Mont St. Michel, which at high water is completely surrounded, but from which at low water the sea recedes to a great distance, leaving it dry for several miles.

There are three detached rocks projecting north-eastward from Cancale point; of these le Grand Herpin is the most conspicuous: les Filles, which is the outermost, appears at low water.

On the eastern side of the Grand Herpin there is a good anchorage in from 7 to 9 fathoms water.

Le BŒUF and les BŒUFTINS are ledges of dangerous rocks, extending in a south-western direction, and occupying in length at least 4 miles. They are upwards of 2 miles to the south-eastward of les Anquettes, and nearly 6 miles distant from the French shore at high water: they appear at 4 hours' ebb. La Bergerie in one with Seymour tower, N.W. b. W. ¼ W., or Blainville church four times its breadth open N. of le Senequet, will lead between the Bœuf and the foul patch N. of it; but it is difficult to make out Blainville church at all times. The spire of St. Martin's church in sight to the south of Montorgueil castle will clear the south-west extremity of the Bœuftins; or Blainville church in one with Coutances cathedral. The Bœuf appears at four hours' ebb, and the Senequet at two and a half.

The Bœuf and the Anquettes being on all sides beset by a great number of detached dangers, the utmost caution is necessary, when in a large vessel, to navigate with any degree of safety between them, more especially as there exists but one continuous leading mark for the passage, viz., the church of St. Pierre les Moutiers, on the high land to the eastward of Cape Carteret (apparently in the middle of the village, and the only church so situated), with a very short turret,

kept open a quarter of a point to the eastward of the south-eastern pitch of the said Cape, N.E. ¾ N. It will then be also in one with Carteret white church.

The sea to the southward of les Anquettes and le Bœuf, for a very great distance, is much encumbered with sunken rocks, and banks of sand and gravel, having from 4 to 6 fathoms at low water; indeed, between the former rocks and the islets of Chausey scarcely a spot can be found perfectly free from either.

One of these banks lies about 3 miles to the S.E. of La Petite Anquette, with only 14 feet of water upon it, and there are two others again to the S.E. of the former, with as little as 9 and 10 feet upon them. The remarkable trees on Mont Huchon open to the south of the northern sandy point of Blainville river will clear the danger. A rock, called La Mariée, lies 3 miles to the southward of the latter bank. Coutances Cathedral its own breadth open to the northward of Agon will lead you to the northward of La Mariée, though close to it; Montmartin church and mill in one, S.E. b. E. ¼ E., will carry you to the southward of it; La Petite Canue midway between the two Huguenans islands, S.S.W., will lead you between it and La Catheue; and La Petite Canue in one with La Conchée will carry you to the westward of it. La Mariée shows at half an hour before low water.

The breadth of the ship channel between Chausey Isles and Les Minquiers is very much narrowed by the bank called Les Ardentes, on the eastern, and by the various shoals which branch east and south-east from Les Minquiers on the western side. At low water great spring tides its breadth scarcely exceeds 3 miles in some places. La Grande Canue never wholly covers; but at this period Les Ardentes cannot be considered dangerous, there being even at half tide not less than 16 feet water upon them. Each side of the Les Ardentes is steep-to, and there are 6 and 7 fathoms all around and between them.

About 1¾ mile to the south-westward of Les Ardentes lies the south end of a rocky bank, on which there are but 12 feet at low water. This bank trends from thence in a northern direction, is in length 1½ mile, and has 28 feet water on its northern extremity: nearly midway between the north end of this bank and Les Ardentes there is another rocky ledge with only 21 feet upon it.

About 2 miles to the westward of La Corbiere of Chausey lies an oyster bank, on which there is now as little as 5 and 4 fathoms.

If you intend, therefore, to pass between Chausey Isles and Les Minquiers, and to the westward of Les Ardentes, after the period of half ebb or before that of half flood, you must, after having rounded Les Caux des Minquiers, on any of the given leading marks from St. Aubyn or Grouville bays, and which you may conclude to have accomplished when Maitre Ile (Minquiers) bears to the westward of W. b. N., at which time Agon church will appear exactly midway between Coutances cathedral and some remarkable trees, steer towards Maitre Ile until Seymour tower comes open to the eastward of the new church of Gouray one-third of the difference between the said church and Montorgueil castle. These directions will lead you between Les Ardentes and Les Minquiers, and between La Corbiere and Les Sauvages, in not less than 24 feet at low water.

Should all or any of the above leading marks be obscured by hazy weather, be cautious, when rounding Les Caux des Minquiers, not to haul to the south-westward to clear Les Ardentes, until Maitre Ile (Minquiers) bears at least W. b. N., or to the northward of it, and not to approach the said Maitre Ile nearer than 6 miles at least; and, in order to pass to the westward of Les Ardentes, do not bring La Corbiere of Chausey more to the southward than S. ½ E., minding, when rounding the western part of the latter island, either to borrow within a mile of the projecting rocks, or to keep at the distance of 2½ miles from them, in order to avoid the before-mentioned oyster bank. La Petite Canue in one with Le Bec de Champeaux will carry you to the eastward of Les Ardentes in the deepest water. This channel is to be preferred to that between Chausey and Les Minquiers at low water.

LES MINQUIERS lie between Jersey and the coast of Bretagne, somewhat nearer to the former than the latter, and are very extensive. They are an assemblage of rude, irregular rocks, and connected by ledges of shingle and sand, and

beds of mud. A few of these are always above water, viz., the Maitre Ile, Maisons, Calfateurs, Blanc Roque, Rocher du Nordest, and les Faucheurs to the south-westward; the greater part, however, shew at low water, though there are many constantly covered. Maitre Ile, on the eastern part of the ledge, is about 100 fathoms in length and 50 in breadth, and is 72 feet above the level of high-water ordinary neap tides. Les Maisons, situated on the western part of the ledge, are not quite so high, being 63 feet only.

To the south-eastward of Maitre Ile there is a small roadstead or cove, which dries at low water.

There are many temporary anchorages for small vessels, within and among the Minquiers, as well as passages through them at high water, indeed even at half-flood, though very intricate.

THE DERBE forms another cluster of the Minquiers, to the westward of les Maisons, from which it is detached, and appears at half-ebb, or rather before. The Derée is by no means the western extremity of Les Minquiers, there are several sunken rocks to the south-westward of it, at the distance of 5 miles, two of which shew themselves at low water, and are called Derée Française, and there are two heads to the north-westward, at the distance of 1½ miles, which shew themselves at low water, great spring tides also; on the south eastern side there are also many which occasionally appear.

The Four rock is on the southern side of Les Minquiers, at the distance of nearly 5 miles, and appears at half ebb. This rock, with Les Rochers du Sud, lying to the north-westward of it, are all extremely dangerous.

When rounding the Minquiers the tides are a most important consideration, and the neglect of them appears to have been the cause of many a loss.

St. Pierre church kept in one with the White Signal-house on la Moy, or St. Ouen church in one with or open to the westward of Corbiere point (Jersey) will carry you at least 3 miles to the westward of all danger in the neighbourhood of the Derée, and in a depth of not less than 18 fathoms water. Bring the mill of Tertre Morgan, which stands inland to the southward of Cape Frehel, and is considerably elevated, open to the westward of l'Amas de Frehel, the same distance as that huge rock is westward of Cape Frehel light-house, S.S.W.; this will carry you a mile to the westward of all danger in that neighbourhood; and le Grand Larron Semaphore, touching the eastern end of Cezembre, S. b. E. ¼ E., will clear les Minquiers to the south-westward. Le Grand Larron is a signal tower standing among the trees on the heights over St. Servan, and is very conspicuous there is a semaphore-staff in the centre of it.

In passing between le Fruquier Aubert and les Anquettes, the same precaution must be used to preserve the leading marks as when passing between Seymour tower and les Anquettes, because there are three rocky ledges lying exactly in the fair-way of the Channel, two of which are precisely upon the given leading marks, whereon at low water there is not more than 5 and 12 feet respectively. Being in Grouville bay, therefore, and bound to the south-eastward through this passage, delay to weigh, if possible, till one-quarter flood at least, for then you will ensure 10 feet water over these ledges, calculated for great spring tides. When between les Anquettes and Seymour tower, being the conical-shaped promontory of la Coupe open to the eastward of the high point of Verclut N. ¼ W., or St. Catherine tower in one with Archirondel tower, N. b. W., and run upon either of these intersections until St. Pierre church has opened to the southward of Ikhot tower; you are then to the southward of the said shoals, and may proceed either for Chausey or the French coast.

LES CAUX DE MINQUIERS are very extensive shelves of sand, shingle, and rocks, which are promiscuously scattered in almost every direction between east and north from Maitre Ile; the principal direction, however, is north-eastward, in which position some of the most dangerous exist, and distant from the Maitre Ile nearly 6 miles. The safest and most frequented passage is to the north-eastward of the whole. The northern and eastern boundary of this group is steep-to, having at least 9 and 10 fathoms within half a mile of them.

Various banks and shoals project also in the direction of S.E. and S. from Maitre Ile, to nearly 4½ miles; the whole extent of the Plateau des Minquiers, in

an E. b. N. and W. b. S. direction, being nearly 16 miles. The most conspicuous mark for the north-eastern ledge is La Tour d'Auvergne in one with Grouville mill, N. ½ E., or St. Martin's church in one with the five Martello towers, which stand to the northward of Point la Roque; and Roselle mill open to the eastward of Seymour tower will carry you to the eastward of it.

DIROUILLES.—The group of rocks called Les Dirouilles lies to the north-eastward of the island of Jersey, in the vicinity of Les Ecrehous, from which they are distant about 4 miles, and nearly the same distance from La Coupe point. The channel between them and Jersey is very deep and free from danger at all times of tide. The marks to clear the western extremity of these rocks are, Verclut point shut in by that of La Coupe, N. ½ W., or Roselle mill, well open to the westward of Tour Roselle.

There is a reef of rocks on the northern side of the Ecrehous, and wholly detached therefrom, called Le Ruquet, to avoid which be careful to keep Pleinmont point in sight to the northward of Les Burons des Dirouilles.

CHAUSEY.—The islets of Chausey are an assemblage of little islets and rocks, of different heights and dimensions, extending in almost all directions, and occupying a space of nearly 16 square miles; the principal or largest of them is on the southern side, and may be distinguished by a light-house at the east end, 120 feet above high water; it shows a fixed light, bright, with a red flash every 4 minutes, and may be seen at 15 miles' distance in clear weather. It lies about 19 miles from La Roque in Jersey, 11 miles from Maitre Ile des Minquiers, and 9 miles from Granville. The anchorage generally resorted to by ships of war is to the south east of Porte Marie.

The best position for a large ship to anchor outside of Port Marie is with La Tour Beacon on the Grande Isle bearing N. b. W., and distant from the shore a mile, or half a mile, in 7 or 8 fathoms or more, according to the direction of the wind and draught of water. When at anchor, Coutances cathedral should appear in sight to the northward of Le Grand Huguenant, E.N.E. ¾ E., and l'Enseigne should be seen eastward of Point de la Tour. All the northern shore of this group affords shelter against southerly, south-westerly, and south-easterly winds; it is, moreover, bold, and may be approached without fear.

Nearly N. W. b. W. from the old castle on Chausey, and about 6 miles distant, lies that dangerous cluster of rocks called Les Sauvages, and at the distance of 9¾ miles N.W. b. W. ½ W. from the same fort is La Souarde. These rocks show at low water equinoctial tides. Le Suhal lies about half a mile to the northward of the latter, but has now 15 feet water over it. You are to the westward of the Sauvages when the church of St. Pierre or La Bergerie comes in one with the Maitre Ile of the Minquiers N. ½ E. The spire of Granville church, open to the northward of Chausey castle S.E. ¾ E., will lead you to the northward of them. Chausey castle, open to the southward of the Corbiere, will lead you to the southward of them; and the mill of Terquelé, wholly in sight to the eastward of the high land of Point Meinga, S.S.E. ¾ E., will carry you to the eastward of them; as will also Cancale church when in one with Haut-bout windmill. In the passage between Chausey and the Minquiers the soundings, when not interrupted by banks, seem pretty regular. Near to the former isle are 6 and 8 fathoms, and the water gradually deepens as you proceed westward. Close to the south-eastern edge of the Minquiers you will find from 14 to 17 fathoms; but from hence you very suddenly shoal to 20 feet in several places and in others to much less.

Between the points of Cancale and Meinga the approaches to the land require great caution, because of the many rocks between those headlands. Of these Les Tintiaux are the principal: they are in length one mile and a half, and three quarters of a mile across, and most of them appear at four hours' ebb.

A rock, with 10 feet upon it, called La Basse Grune, lies to the N.W. of Grand Herpin: Granville church in sight to the northward of the lighthouse will carry you well to the northward of it; Garde Guerin Semaphore in one with La Petite Conchée will carry you a mile to the north-westward of it; Mont St. Michel in one with Le Grand Herpin will carry you to the southward of it, and between it and La Basse du Nid; and Cancale church open to the eastward of *Haut-bout mill* will lead you to the eastward of it.

Basse du Nid lies about one mile and a quarter to the southward of La Basse Grune, and has 18 feet upon it at low water. A rocky patch, called La Rault, has also been found one mile and a half to the westward of the Basse du Nid, and the same distance to the northward of Meinga point, with 3 fathoms upon it.

When ranging along this part of the coast at or after the dangerous period of half ebb, bear in mind that so long as the lighthouse on Cape Frehel is kept open to the northward of Le Rochefort you will have nothing to fear from the Tintiaux, or from the shoals in the neighbourhood of Cancale point; and that, if Grand Herpin be kept open, twice its own breadth to the northward of Rochefort, you will pass to the northward of a reef called Le Vieux Banc, and of all other dangers which lie between it and Rochefort.

Le Rochefort lies one mile and a half to the north-westward of Meinga point: it shews at 2¾ hours' ebb, and stands 34 feet high at the low water of great springs. The Semaphore on Garde Guerin its own length open to the northward of La Grande Conché will lead you a quarter of a mile to the northward of it; Paramé church in one with La Bigne will lead you to the westward of it; and a remarkable tree in the town of Roteneuf in one with the western rocky bluff point of Binar will lead between the Rochefort and Les Hautieux into Roteneuf, on entering which harbour you must borrow within 30 fathoms distance of Binar point when passing it. A vessel, however, drawing 10 feet water, cannot enter Roteneuf till three hours' flood.

ST. MALO.—The port of St. Malo is very difficult of access, being completely barred by shelves of sand and rock, most of which dry at low water. There are, however, many passages leading thereto, the four principal of which are as follow:—La Bigne passage from the eastward, La Conchée passage from the northward, La Grande and La Petite Porte from the north-westward, and the Decollé passage from the westward. A fixed light is erected on the new Mole des Noires, which may be seen at the distance of 10 miles.

La Bigne passage is so called from the rock of that name, which lies three quarters of a mile to the north-eastward of La Varde point, and is always very high above the water. When entering this passage, bring the great church of St. Malo in one with La Bigne, S.W. b. W., and run in on the eastern side of the Rochefort till within 3 cables' length of La Bigne; then edge away to the southward, so as to round the latter rock at the above distance. This distance will be further regulated by the south-eastern side of Grand Bey island being brought in one with the north-western bluff of La Varde point, but not shut in with it; then steer so as to bring the mill of Villerenaut to touch the southern side of St. Enogat church W.S.W. ½ W. The latter mark will lead you clear of all danger as far in as the outer fort, which is called Petite Bey fort, and over the Banc de Bey, minding, however, to open the said mill to the northward of the church when passing La Petite Dodehal rock, and again to bring it on as before when you have passed it, in order to avoid Le Crapaud; and, having rounded the Petite Bey fort, you may haul to the south-eastward for St. Malo road. The mark for the Petite Dodehal is the two Semaphores of St. Malo in one.

La Conchée passage derives its name from a huge rock of that name, with a battery on it, to the eastward of Cezembre. When entering this channel bring the south-west corner of La Cité in one with the middle of Grand Bey island, S. b. W. ½ W., and passing a quarter of a mile to the eastward of the Conchée, run in this direction between La Platte and Les Pierres aux Anglais, on each of which there is a beacon, until the windmill of Villerenaut begins to appear to the southward of St. Enogat church. The latter mark will lead you over the bank and between the Crapaud and Petite Bey fort, having cleared which you may, as before observed, haul south-eastward for St. Malo road.

The only navigable channels into St. Malo at low water are those of La Grande and La Petite Porte. They both lie to the south-westward of Cezembre island, and are divided by the rocks called Les Pierres des Portes; but they both unite between Le Jardin and La Savatte, on the eastern rock of which there is a beacon. When entering the channel of La Petit Porte, bring the west end of Cezembre island in one with the centre of the town of St. Malo, S.S.E. ½ E., and, having

arrived within 2 miles of the island, steer to the southward, so as to bring the southern corner of the roof of the Caserne at St. Servan in sight to the northward of the north-east angle of the fortifications on La Cité, a remarkable tree will at the same time appear in the opening; this mark will lead you between the Pierres des Portes and La Hupée, between Le Jardin and La Traversaine, and thence all the way up to the road of St. Malo, between Le Buron and Les Clefs des Ouvras, in not less than 24 feet at low water. Two rocky patches lie, one to the north-eastward of the Pierres des Portes, and another to the south-eastward, with only 14 and 12 feet on them respectively, and both somewhat encroaching on the fair way; at one quarter flood, however, these depths increase to 19 and 17 feet, and to 34 and 32 feet at high flood. So that this leading mark still remains available at tide time. There is a beacon on Le Buron and also on Les Ouvras. The above line of direction, however, borrows somewhat close to the Pierres des Portes on the one hand, and to the beacon on Le Jardin on the other; you should, therefore, open and shut those objects in a trifling degree as you pass these rocks, but not to give a greater latitude than half a cable's length either way. You will be to the eastward of the Traversaine when the mill of St. Lunaire comes within its own length of Le Haumet; there are only 2¼ feet water upon La Traversaine at low water. If you intend to enter St. Malo by the passage of La Grande Porte, bring the steeple of St. Enogat church in one with the eastern side of Haumet, S. b. E., and run in with this mark until the two windmills of Petite Paramé are in one with the southern angle of the fortifications upon Fort Royal, S.E. ¼ E.; this will carry you to the southward of the Pierres des Portes; having passed which you must bring the southern corner of the roof of the Caserne in St Servan in sight to the northward of the fortifications on La Cité as before. No square-rigged vessel of burthen should attempt these channels without a free wind, and recollecting that the course, when within the narrows, is between the S.S.E. and S.E. b. S. points of the compass.

The Decollé passage lies close along the southern shore, between Decollé point and that of Dinard; its western entrance is between Decollé point and La Mouilliere rock, on which there is a beacon. The breadth of the entrance at low water does not exceed 50 fathoms. The mark for the centre of the fair-way is Paramé church and St. Hydeuc windmill in such a position between Fort Royal and Ile harbour, as that the church shall appear the same distance to the northward of Fort Royal as the mill appears to the southward of Ile harbour. The leading mark for this narrow Pass, according to the Pilot Françaisse is Le Grand Buzard in one with St. Hydeuc church. Having passed the narrows, bring the castle of La Latte in one with a high rock to the westward, called Nerput, and run to the eastward upon this mark between the Petit Buzard and Petit Geniflet rocks, both of which have beacons, until St. Enogat mill opens to the eastward of the church, from whence the remarkable house called Bellaire, which has several chimneys and stands elevated in the centre of the town of St. Servan, touching the north-east end of the fortifications of La Cité, will lead into the fair-way of the river, between Les Pourceaux, on which there is a beacon, and Dinard point.

There are two rocks situated in the road of St. Malo, namely, Le Broutard and Les Pierres de Rance; upon the former are 7 feet, but the latter shows at low water. The best anchorage is between these rocks and the town upon the following marks:—Grande Conchée in sight to the westward of Petit Bey fort, and Fort Royal appearing between Grand Bey island and the Garrison of St. Malo: here you will never have less water than 30 feet.

The marks for the best anchorage in the road of Dinard, usually called La Rance, are as follows:—Grand Larron Semaphore in one with Solidor tower, and the mill of Champfleuri just in sight. The road of Dinard is preferable to that of St. Malo, being sheltered against the prevailing winds, and is the general rendezvous of the ships of war.

The road of Solidor lies immediately in front of the town of St. Servan, within the Solidor bank; the water is, however, shallow, and long-heeled vessels take *the ground* occasionally, the greatest depth being 18 feet at low water. To run

into Solidor road, bring the tower of Grand Larron in one with that of Solidor, and these objects will lead you between the point of La Petit Cité and the Solidor bank; when within the latter, you may select a berth, and anchor as convenient.

The anchorage of Les Ehbiens is between Ile Agot and Ehbiens island, upon which there is a massive watch-tower. In this little port, a vessel drawing 10 feet water may secure herself in perfect safety. To run in, bring the mill of St. Guildo in sight (but only sight, or barely open, giving the rocks and island when running in a berth of 1½ cable, but not more,) to the westward of the Guard-house on point Chevet, and, hauling close round the south-east point of the island, anchor; or, if necessary, run upon the beach under the watch-tower.

Le Vieux Banc is a rocky ledge 4 miles to the north-westward of Cezembre, the south-west part of which appears at low water. Paramé church in sight to the northward of Petite Conchée, S.E. ½ S. will lead you to the northward of the Vieux Banc; the same church in sight to the southward of Cezembre, S.E. ½ E., will carry you to the southward of it; the Mill of St. Guildo in one with the western part of the isle of Ehbiens, S.W. ¼ W., will lead to the eastward of it; and the Mill of St. Jacut in one with the eastern part of the island, S.S.W. ¾ W., will carry you to the westward of it. This shoal generally betrays itself by rippling.

Le Banchenou lies about 2 miles to the south-west of the Vieux Banc, and directly in the fair-way: it breaks occasionally; but there are never less than 20 feet upon it. St. Jacut mill in one with Le Tour des Ehbiens, S.S.W., will lead right upon its shoalest part; and you will avoid it by opening the said mill proportionally eastward or westward of the island.

Les Bourdinots lie about a mile E. ¼ N. off the point of St. Cast, and appear at low water. Grande Conchée well open to the northward of Cezembre, or Tertre Morgan mill in sight to the northward of St. Cast Peninsula S.E., will lead to the northward of them.

La BAIE de la PRENAY, between the castle of La Latte and St. Caste, affords very good shelter against off shore winds, and excellent holding ground.

La Catis Shoal lies 2¾ miles to the north-eastward of fort La Latte. The least water upon the Catis is 19 feet. By shutting in point d'Erqui with cape Frehel, you will pass to the southward of it; and by opening point d'Erqui half a point to the northward of l'Amas de Frehel, you will pass to the northward of it.

Le Sauvage is 6 miles to the north-eastward of fort La Latte, and in the same direction as the Catis. There are never less in this shoal than 29 feet. The same church on with the east end of Cezembre clears it on the north side.

La Trouvée is a rocky ledge nearly 8 miles to the northward of Cezembre island. There are but 14½ feet upon this shoal, with deep water all around it.

CAPE FREHEL bears S.S.W. ½ W. from point Corbiere of Jersey, distant nearly 10 leagues; it is high and steep-to, and has a lighthouse standing upon it, the light being 262 feet above high water, and revolving every half-minute. There is a high rock to the north-west of the lighthouse, called l'Amas de Frehel, which is never covered, and serves as a leading mark in various cases. Between the chateau of La Latte and Cape Frehel the shore is very rugged and precipitous, and nearly due east from the lighthouse is the rock of l'Etendrée, which shows at four hours' ebb, and from which a shallow bank extends three-quarters of a mile to the south-westward.

There are two other rocks off the fort de la Latte, which break at low water, and which render all approach, within a mile of the shore, very hazardous.

GUERNSEY is nearly in the form of a right-angled triangle, the north-west side forming the hypothenuse, the length of which is about 7 miles. The land on the south side is remarkably high and steep; but it gradually lowers towards the north, where in some places it is very little above the level of the sea. The island is encompassed with many very dangerous rocks, the principal of which are the following, viz., the Hanois, the Grunes, the Sambule, on the west and north-west sides; the Brays, with several others, on the north side; and on the east and north-east sides lie the islands of Herm, Jethou, &c., which are also

surrounded by numerous rocks and ledges. The town of St. Pierre on the east side of the island has a capacious pier, which is 60 feet in width at the foundation, and in height 35; but, from the manner of its construction, the strong S.S.E. and southerly gales send in a great swell. To the south-eastward of this pier stands the citadel of Castle Cornet, which at low water communicates with the main land. More extensive piers are now (1858) being constructed.

The Great Road of Guernsey lies in front of the town of St. Pierre, and to the north eastward of Castle Cornet, and is generally the anchorage of Her Majesty's ships. The ground is excellent for holding, and affords good shelter against all winds, except those between S.S.W. and S. b. E., which send in much swell and sea.

About half a mile E. b. S., from point St. Martin, begins the south end of the Great Bank, on some parts of which there are only 10 feet water at low-water spring tides. This bank extends N.E. b. N., and is in length 1½ mile, and half a mile where broadest. The marks for the shoalest part of the bank to the southward are, Val Windmill well open to the westward of Mont Crevil Tower, and a remarkable white house over Fermain Bay, touching the south side of Beequez guard-house; and the marks for the shoalest part to the northward are the white Watch-house on the south pier-head just open to the southward of Castle Cornet, and Val Windmill in one with the eastern side of Mount Crevil Battery. Mount Crevil Battery joins the Tower.

The Little Road of Guernsey lies to the northward of Castle Cornet, and between it and the rocks called the Blanche and Sardrette, on both of which are placed beacons. This road is invariably used by traders and small vessels, and affords excellent shelter in from 2 to 4 fathoms.

ST. PIERRE—The harbour of St. Pierre is formed on the south by a mole, connecting Castle Cornet with the main land, and on the north, a mole is in course of construction; this will render the harbour perfectly secure. On the inner South Mole head a fixed light is placed; bring it to bear W.N.W. when running into the harbour.

There are several very dangerous rocks in the vicinity of Castle Cornet which ought to be carefully avoided,—namely, Les Tremies and Les Boués du Nord to the north-east, l'Hutrier to the south-east, Le Ferico east, and Le Moulinet to the south-west. The Ferico lies more than a quarter of a mile from the castle, and is, consequently, right in the fair-way of vessels bound into the Little Road from the southward. The mark to clear all these rocks on the eastern side is the tower of Hogue à la Pere open to the north-eastward of Gobeau Beacon, N. ¼ W. Be careful when rounding Castle Cornet on the N.E. side, for the Little Road, not to haul to the westward until the town church is within a sail's-breadth distance of the watch house on the south-pier head, by which precaution you pass to the north-eastward of the Boués du Nord.

The stream in the Great Road sets nearly straight through both ways, the flood running N.E. ¼ N., and the ebb S.W. ¼ S. by compass. The tide called flood, between the island of Guernsey and the rocks which project from the S.W. end of Jethou, assumes two different courses. One arm thereof runs directly through the Great Road, and thence into the Little Russel. Another, branching off at right angles nearly from the former, runs to the eastward towards Jethou, and through the before-mentioned rocks into the Great Russel. The tide called ebb runs directly the reverse; the stream from the Great Russel uniting with that in the road, after it has passed the rocks at Jethou, from whence they both set to the south-westward.

The tide in the Little Road, from half flood till half ebb, sets E. b. N., and from half ebb to half flood, W. b. S. It is high water, full and change, at Guernsey and Sercq at half-past six o'clock, and the water rises on equinoctial spring tides 31 feet perpendicularly, though during the neaps not more than 14 feet.

The ISLAND OF HERM lies 3 miles E. b. S. from Guernsey pier, and with Jethou, divides the Great and little Russel channels from each other. These *islands* are surrounded by a great number of rocks and ledges, some of which

are always above water. The channels between the islands and rocks are extremely intricate, and rendered dangerous by the rapidity and the variety of the tides. Half a mile south-westward of Herm lie the little islands of Jethou and Crevichon, the former being attached to the latter by a shingle causeway, which is covered at half flood. There is a very good anchorage between Herm and Jethou, where a small vessel may ride secure from all winds but those which blow from between south-west and east. The best entrance thereto is from the Great Russel. The dangers to be apprehended in going into this anchorage, are Les Fourgues, a patch of sunken rocks to the north-eastward of La Goubinière, in the Great Russel, and further in the Mulet on the starboard hand, and the Tinker on the port. The Mulet lies about half a cable's length from the south point of Herm island, and the Tinker about twice that distance to the eastward of Jethou. There is one great convenience attending this anchorage, viz., that the tide runs nine hours to the southward, and only three hours to the northward.

THE GREAT RUSSEL channel lies between the islands of Herm and Jethou to the north-west, and the island of Sercq to the south-east. It is the eastern passage to Guernsey, and is above 2 miles in breadth, and very easy of access even to strangers. The course to it from the middle of the Race of Alderney is W.S.W. nearly, distant 7 leagues. In proceeding, however, towards this channel from the north-eastward, great care must be taken with a large vessel to avoid the Banc de Chole, which lies nearly in the direct line between the Race of Alderney and the entrance to the Great Russel. The bank extends N.E. and S.W., nearly 6 miles in length, and has barely 10 feet water on its shoalest part at low water equinoctial tides. The mark to avoid its south-western end is Jerbourg tower in one with La Fauconnière, on which there is a beacon, W. ½ S.; and to avoid the north-eastern end, Jerbourg tower just open to the northward of the northernmost high land on Herm island, W.S.W. ¼ W.

Having arrived at the entrance of the Great Russel, you will perceive a rock on the western side of the channel, called La Noire Pute, lying about a mile south-eastward from the mill on Herm island, of which you must pass a full quarter of a mile to the southward. When abreast of the Noire Pute bring St. Martin point, (the south-eastern part of Guernsey) a quarter of a point open to the southward of a remarkable large rock, which lies half a mile S.S.W. from Jethou, called La Goubinière, W. ¼ S. This mark will carry you to the southward of Les Bouillons and Les Fourgues, which are the only dangers to be apprehended between the Noire Pute and the Goubinière. Noire Pute is never wholly covered. When the white watch-house, on the south pier at Guernsey, comes open to the southward of Castle Cornet, or until St. Martin's church steeple, seen over the trees, appears over the middle of Fermain sandy beach, will lead you to the southward of Le Sardrière and Les Têtes d'Aval; after having rounded which, you may boldly steer for the road.

The thwart-mark for Le Banc des Anons is Mont Crevel tower (white), in one with the eastern side of a remarkable high rock, lying half a mile W.S.W. from Jethou, called La Grosse Ferriére, N. b. W. ¾ W. There is a very good channel to the north-eastward of the Têtes d'Aval, between them and the Ferriére, the leading marks through which are the Noire Pute in one with the Goubinière, E.N.E. ¼ E. and the town Church Spire directly over the southernmost angle of Castle Cornet, N.W. This passage, however, being narrow, should not be attempted by a stranger.

In turning through the Great Russel you may approach the island of Sercq, when standing to the south-eastward, within half a mile. Off the west side of Brecqhou there is a sunken rock, La Veste. To the south-westward of Brecqhou, and between it and Sercq, are the rocks called Les Dents and Les Hautes Bouées, lying nearly a mile from the land; the former appear at half ebb, and the latter at low water. About 1¼ mile to the westward of Brecqhou lies a sunken rock, called La Grune, over which there is never less, however, than 36 feet water. When standing to the northward towards Herm and Jethou, you must not shut in St. Martin point with the Goubinière (when to the eastward of the latter rock), but

always keep it a quarter of a point open to the southward thereof, by which precaution you will avoid the Fourgues and the Bouillons.

The north-eastern stream of tide slacks half an hour sooner on the south-eastern side of this channel than on its north-western side.

THE LITTLE RUSSEL channel lies on the north-west side of Herm island, and between it and Guernsey, and is much contracted by the numerous rocks which project off from both islands, as far out as Le Roustel and La Rousse, and is little more than 3 cables' lengths. On the Rousse there is an iron beacon. The entrance to this channel from the northward is between the rocks called Les Brayes on the western side, and Les Anfroques on the eastern. The approach to the Brayes, as well as to Anfroques, is exceedingly dangerous, as well on account of the tides as for the numerous hidden and other rocks by which they are encompassed. The mark to clear the Brayes, and all danger to the eastward and south-eastward of them, is the south-western end of Little Sercq a little open to the eastward of the low north-eastern sandy point of Herm island, S. ½ E., and this mark will lead you into the fair-way of the channel. The mark to avoid the Plat Boué and the Boufresses, and all danger to the north-westward and westward of them, is Catel church (the spire of which is whitened) a quarter of a point open to the westward of Val castle, W. b. S.; and when the north-eastern end of Sercq island comes on with the middle of Grand Anfroque you are abreast of Plat Boué. The above mark will also lead you into the fair-way of this channel.

St. Martin point just opening to the westward of Brehon beacon, bearing S.W. ½ W., must be considered as the best leading mark to the entrance and through the fair-way of the Little Russel. This mark will lead you in from sea and carry you through between the Roustel and the Rousse. There is a black buoy moored about 10 fathoms to the S.W. of Roustel, and a beacon on the range of rocks called Platteroque, to the W. of Roustel, with a basket on its summit. When the north-east end of Sercq island begins to shut in with the northernmost bluff land of Herm island, you are abreast of the former rock as well as the latter. Le Roustel is the most dangerous rock in the Little Russel; it lies exactly in the mid-channel, and does not appear until four hours' ebb. There is another dangerous sunken rock lying E.N.E. from Roustel, 50 fathoms distant. There is also a rock 30 fathoms W. b. N. of the Rousse. Having passed the Rousse and Les Bouées Genettales, upon the above leading mark, bring the south-eastern end of Longou Pierre (which is 2 miles to the north-eastward of the Rousse, always high above the water), a quarter of a point, but not more, open to the south-eastward of the Rousse, E. ½ N., by which you will pass between La Grune au Rouge (on which there is a red buoy) and Le Brehonnet, that is, to the eastward of the former and to the westward of the latter. Longue Pierre open to the south-eastward of the Rousse, until Crevichon appears open to the southward of Brehon beacon, S.E. ½ S., you are then clear of the Grune au Rouge, and should steer directly for St. Martin point until the town Church opens to the southward of the white Watch-house on the south pier-head, W. ¼ N., by which course you will pass to the eastward of Les Trois Grunes and Le Boué Agenor, and may thence run either into the Great or Little Roads. To pass to the northward of the Grune au Rouge, bring Longue Pierre a quarter of a point open to the north-westward of the Rousse, and keep that mark on until Val windmill appears touching the western side of Mount Crevel tower (white), N.N.E.; this latter mark being kept on till the town church opens, as before directed, will lead into the road, to the westward of the Trois Grunes and the Boué Agenor, and to the eastward of the Fruquiers and the Reffée. The utmost circumspection must be used, on nearing the Roustel, not to bring Le Brehonnet (a half-tide rock close to the westward of the Brehon) on with St. Martin point when standing to the westward, nor to bring the Brehon on with that point when standing to the eastward. These rocks lie between Brehon and the Rousse, and may always be avoided by keeping St. Martin point a quarter of point open to the westward of Brehon beacon or pyramid.

Vessels proceeding round the north-west side of Guernsey should not approach

it nearer than 3 miles at least, there being several very dangerous ledges of rocks there.

THE HANOIS, OR HANOVEAUX ROCKS, on which it is proposed to erect a lighthouse, lie off the south-western point of Guernsey, their western extreme being 1¼ miles from Pleinmont point in the direction of N.W. In rounding these rocks give Pleinmont point a berth of at least 3 miles, in order to avoid the sunken rocks which stretch off therefrom, in the direction of N. b. E., called Les Bissets. Having rounded these truly dangerous rocks, which you cannot safely be deemed to have done until the Corbière, or Point la Moye, appears open to the southward of Pleinmont point, S.E. b. E. ¼ E., steer S.S.E., minding to keep the west end of Lihou Island in sight to the westward of Pleinmont point until the Mill on Great or North Sercq opens to the southward of Jerbourg point, the apparent distance between it and the isthmus of Sercq, E.S.E. ½ E., in order to avoid not only Pleinmont ledge, which lies one mile to the southward of Pleinmont Guard house, but also Les Lieusses. This latter mark will carry you to the southward of all dangers on the south side of Guernsey, to the westward of Point la Moye. Les Grunes de Jerbourg are a very dangerous cluster of rocks a full half mile from the shore, and in the direction of south-west from St. Martin point.

The dangers to be apprehended to the eastward of Point St. Martin are, La Longue Pierre de St. Martin, La Gabrielle. and la Grue de Creux, as well as the shoal part of the Great bank. Longue Pierre appears at one-quarter ebb, and the Gabrielle at low water ordinary spring tides, at which period there are only 14 feet on the shoal part of the Great bank.

You may anchor anywhere on the south side of Guernsey with the wind along or off the land, for the purpose of stopping a tide only, provided the north end of Sercq island is kept in sight to the southward of St. Martin point.

There are but few bays or harbours in any part of Guernsey which are capable of receiving vessels of a greater draught of water than 9 feet, and into those a stranger would find the utmost difficulty in entering.

Petit port lies between Jerbourg and Icart points, and affords good shelter against easterly, northerly, and north-westerly winds, in from 5 to 9 fathoms, bottom of fine clean sand.

St. Samson harbour lies on the eastern side of the island between Val Castle and Mont Crevel, but vessels lie aground at low water. It is exceedingly difficult of access, by reason of the rocks.

Bourdeaux Havre is to the northward of St. Samson, but used only by fishermen.

The streams of tide in the Great and Little Russels set straight through both ways, according to the trend of their respective channels, and run five hours and a half on each tide, allowing better than half an hour for high and low water slack. In the Great Russel the flood-stream runs E.N.E. ¾ E., and the reverse with respect to the ebb: in the Little Russel, N.E. ¼ E. nearly, and the reverse on the ebb. At the north-eastern mouth, however, of the Little Russel, between the Brayes and the Anfroques, the tide assumes the direction of that in the offing, viz., the first two hours of the flood sets directly for the north end of Herm island, gradually joining the south-western stream in the Russel, and the last hour of the flood, as well as the first of the ebb.

The stream of tide on the north-western coast of Guernsey, 3½ miles N.W. b. W. from the Grunes du Bois, begins to set to S.S.W. ¼ W. at low water, and continues to run in that direction, gradually veering to the southward and eastward until one quarter flood, when it sets S.S.E. ¾ E., and thus continues until half-flood, at which period it veers to S.E. b. E. ¾ E., and runs until three-quarters flood, after which it runs N.E. b. E. ¾ E. until high water.

No eastern inclination of the tide is perceptible on the southern side of the island, between Pleinmont and St. Martin points, until the water has risen two hours by the shore; it then begins to run along the land S.E. b. E. ½ E. as far as St. Martin point, where, meeting with the last hour's ebb from the Great road, they unite and set S.S.E. and S.E. for one hour, or until half-flood, when the tide veers to the north-eastward, and sets directly through the Great Russel with con-

siderable strength. At the same time that the tide begins to run along the southern shore of Guernsey it also sets through between the island and the Hanois rocks, into and through Rocquaine bay. The tide between Lihou island and the main is exceedingly rapid, and the bridge there is covered at 2½ hours' flood.

It must be remarked, that although the stream of tide begins to set through the Little Russel at the same time that it does in the Great Russel, viz., half-flood, yet there is no northern inclination round St. Martin point until four hours' flood; care must, therefore, be taken that the first of the eastern tides does not draw you into the Great Russel, or among the rocks in the vicinity of the Têtes d'Aval.

The tide in the vicinity of the Grand Braye is subject to still greater varieties and inequalities. N.N.W. therefrom, at about two miles' distance, from low water until one hour flood it runs S.S.W., from one to three hours S.S.E., from half-flood to four hours' flood E., from four hours until five hours' flood E.N.E., from five hours' flood until half-ebb N.W., from half-ebb till five hours' ebb W., and then S.W. till low water again. On the north-eastern side of the Grande Braye, at one mile distant, from five hours' flood until half-ebb it runs N.W., and from half ebb till low-water W. b. N. The courses of the tides, 2 miles N.E. of the Grand Anfroque, are as follows: from low water until one hour flood, variable between the S.W. and S.E., from one till two hours' flood, S.E. from two till three hours' flood, N.E., from three till five hours' flood, N.N.E., from five till high water, N.N.W., from high water till two hours' ebb, N.W., from two hours' ebb till half-ebb, W.S.W., and from half-ebb till low water, S.W.

The tide on the north-western shore of Guernsey within the rocks called Les Saut Roquiers, l'Etat, &c., and between Lihou Isle and the Grand Braye, begins to drain down along the land to the south-westward half an hour before high water, gradually increasing in strength, and sets in that direction with little variation during the whole of the ebb, and until 2 hours' flood again, when it veers and sets to the north-eastward until half an hour before high water as before; so that there are 8 hours south-western, and only 4 hours north-eastern tide. The tide in Rocquaine Bay sets to the north-eastward from 2 hours' flood until half an hour after high water, when it slacks and remains so for three hours or until half ebb; it then runs down to the south-westward, and so continues until 2 hours' flood, when it again sets to the north-eastward.

The tide to the southward of Les Hanois, and W. ½ S. one mile from Pleinmont Watch-house, begins to run S.S.W. ¼ W. at low water, and so continues until 2 hours' flood, when it sets S.E. b. E. ½ E. along the southern shore, as was before observed. From one-quarter ebb until three-quarters ebb it sets N. b. W. ¾ W., and from three-quarters ebb until low water, W. ½ S. The stream to the north-westward of the western Hanois rock, at a mile distant, begins to run S.S.W. ¼ W. at low water, and so continues until 2 hours' flood, when it veers to the E. b. N., and sets in that direction with very considerable strength until a quarter ebb. From one-quarter ebb until three-quarters ebb its set is N.N.W., and from that period, W.S.W. until low water again. The tide in Grand Havre sets directly in and out, the flood running in S. b. E. for 6 hours, and the ebb N. b. W.

THE ISLAND OF SERCQ lies to the eastward of Guernsey, and divides the Great Russel from the Deroute channel. It is lofty in all its extent, and is in length, including Little Sercq, to which it communicates by an isthmus, or very narrow causeway (called La Coupée), about 2¾ miles, and rather more than 1¼ where broadest. The little island of Brecqhou lies on the western side of the island, from which it is separated by a narrow channel. The approach to Sercq on the north-eastern, eastern, south-eastern, and south western sides, is difficult and hazardous, by reason of the numerous rocks which encompass it, as well as by the rapidity and irregularities of the tide in its immediate vicinity.

Nearly E.S.E., about a ¼ of a mile from the Creux, lie the rocky islands called Les Burons, between which and the island is the passage called Le Goulet, which dries half-way across at low water spring tides; the deepest water being towards the island. Le Blanchard lies to the eastward, about 2 miles from the island; it never appears but on spring tides. The Sardriére rock has never less than 7 fathoms over it.

There is a very good anchorage on the north-eastern side of Sercq, in from 17 to 19 fathoms water, fine clean sand.

BALEINE BAY lies between the Baleine and Conchée rocks, and affords excellent anchorage in from 4 to 7 fathoms water, with sand, fine gravel, and pieces of various sorts of shells, sheltered from all winds that blow from between N.N.E. and W. The only dangers which infest this bay are Les Têtes de Conchée, La Gripe, Les Vingts Clos, and Le Balmie, the former of which have never less than 30 feet over them. La Gripe lies right in the fair-way of the entrance. La Conchée stands about half a mile south-westward of the Burons; it is always above water, and steep-to on its south-eastern, eastern, and north-eastern sides. The Balmie is considerably within and to the westward of the Gripe, and, as it appears at a quarter ebb, is of course to be feared only until that period. Les Vingts Clos lie 4 cables' length to the southward of the Balmie, and between it and l'Etat de Sercq.

La Gréve, or beach, is the name given to an anchorage on the north-eastern side of Sercq. It affords good shelter for small vessels from south-westerly and westerly winds, in from 6 to 9 fathoms water; but the ground being sand and rock, the anchor is frequently apt to come home.

There are two entrances to this anchorage, viz., one from the northward, between the island and the Noire rock, and one from the southward, between the island and the Grand Moie, which is very narrow.

The anchorage in Banquette bay affords very good shelter against easterly, south-easterly, and southerly winds, in from 5 to 16 fathoms water; coarse sand interspersed with small black stones and pieces of sea-weed.

The name of La Grande Greve, or great beach, is applied to another bay which lies on the south-western side of the island, between Brecqhou and Little Sercq, but which is much contracted by Les Dents, Les Hauts Bouées, Les Baveuses, &c. It affords shelter from S.S.E., E., and N.E. winds, in from 7 to 11 fathoms water, fine sandy bottom, with pieces of shells. Should a vessel be unavoidably caught by a westerly wind while riding in this bay, she should immediately endeavour to get out, either to the westward or through the Gulion passage, which latter may with confidence be attempted at half flood.

THE TIDES in the immediate vicinity of Sercq are subject to a great variety of courses during the twelve hours, their direction being governed by the peculiar figure of that island. On its north-eastern side there is a tract of water, in which a perpetual eddy, or slack tide, exists during the six hours that the stream occupies in running to the north-eastward in the Great Russel and the Deroute channels, extending nearly 3 miles from the land, and gradually contracting in breadth as it increases its distance therefrom. The streams of tide in Baleine bay, in Terrible bay, and in the neighbourhood of the rocks called La Conchée, Baleine, Balmie, &c., run eight hours and a half to the N.E. b. E., and only three hours and a half to the south-westward.

The streams of tide on the north-eastern side of Sercq, in La Gréve bay, and in the neighbourhood of the rocks called the Grand and Petit Moie, &c., run eight hours and a half to the S. b. E., and only three hours and a half to the N. b. W. The southern stream commences at four hours' flood, and runs until half an hour after low water, when the northern stream commences and runs faintly for the remaining three hours and a half, or until 4 hours' flood again. The southern stream above-mentioned, on the north-eastern side of Sercq, and the northern one on the south-eastern side, branch off to the eastward of the Burons, where they meet and unite with the Deroute stream, which sets directly both ways, and runs for equal spaces of time.

The stream of tide on the north-western side of Sercq begins to run to the southward at the Bec du Nez, and thence along the land towards the Isle of Brecqhou at three-quarters' flood, near which it meets with the stream of tide from the Gulion Passage; which latter, prevailing over the former, carries it circuitously into the Great Russel to the north-westward, where it unites with that regular stream. The stream begins to run to the north-eastward along the shore from the Moie de Gulion, towards the Bec du Nez, at three-quarters ebb, and so continues until

three-quarters flood again. The stream on the south-western side of the Sercq, in the neighbourhood of the rocks called the Bretagnes, Hautes Bouées, Sercquier, &c., runs 4½ hours to the northward, and only one hour and a half to the southward; the former stream commences at half flood and runs for one hour; it then suddenly turns and runs to the south-eastward for one hour and a half, (or until half an hour before high water by the shore), at which time it again as suddenly veers to the northward, and sets in that direction for the remaining three hours and a half, or until half ebb.

The tide in the Gulion passage runs for equal spaces of time, similar to that in the Great Russel.

THE ISLE OF ALDERNEY is only 3½ miles in length from east to west, and little more than one mile where broadest, which is at its south-west end. It trends nearly E. ¼ S. and W. ¼ N., and the Telegraph hill is 276 feet above the level of the sea. The north-eastern extremity lies N.W. b. W. ½ W. from Cape la Hague in Normandy, from which it is distant 8¼ miles. The approach to this island on all sides, except the north, is rendered extremely difficult and dangerous, from the numerous rocks with which these quarters are infested, some of which are under water; and these dangers are greatly augmented by the peculiar set and velocity of the tides. Among the rocks to the north-westward are Le Burhou, l'Ortach, Les Renouquet, La Verte-Tête, Les Nannels, &c. To the southward are Les Etats, Les Noires-Putes, Le Coquelicot, Le Boni, and l'Etart. To the north-eastward are Les Homeaux Florains and Le Hommet-Herbier, from which projects that very dangerous reef, called Brinchetais, and outside of which is the Blanchard. The tide runs over all these rocks with great rapidity.

HARBOUR OF REFUGE, which is on the north side of Alderney, encloses what was the Road of Braye; the pier when completed will extend upwards of a mile from Cape Grosnez, it takes the direction of N.E. b. E. for about half a mile, and then more northerly into a depth of 18 fathoms at low water; more than one-half of the pier is above the level of high water, and is capable of affording shelter to ships of the largest size; the bottom is composed of fine sand, the depth being from 4 to 12 fathoms. When finished, the entrance will be to the northward of east.

Fronting Port Longy on the south-east side of Alderney, there is an islet called Le Hommet de Longy. The entrance to this port is not more than 200 fathoms in breadth, with a rock right in the fair-way, which dries at low-water great spring tides, and, as both ebb and flood set violently across the harbour's mouth, it is very difficult as well as hazardous to attempt.

There is an outer anchorage to the westward of Port Longy, another to the south-westward of Les Noires-Putes, and a third to the south-westward of Les Etats, called Le Fossé Malieres. The first affords good shelter for a small vessel against north and north-west winds, in from 10 to 16 fathoms water, sandy ground mixed with rock and pieces of shells; the inner part of the Hommet de Longy open to the southward of the Queslingue, and about half way between that rock and l'Etart, at the distance of 150 fathoms from the shore. In approaching this anchorage, care must be taken to avoid the Boni, a dangerous rock, though of small extent, which lies to the southward of l'Etart, and almost half a mile from the shore. It appears at low-water spring tides, but has from 10 to 14 fathoms close round.

The second and third anchorages are sheltered from easterly winds, in from 5 to 12 fathoms water, coarse sandy ground. The mark for the second is the Noires-Putes rocks, in one with the Government telegraph, and your vessel to be distant from the Noire-Putes 400 fathoms. The mark for the third is the south-western Head of la Clanque, just open to the south-westward of Les Etats; your vessel to be distant from Les Etats 400 fathoms.

About one mile and a half from the west end of Alderney lies the rocky islet Burhou. The only safe landing-places are, one on the north, and one on the south side; but at either much difficulty is created by the surf. Between Burhou island and Alderney is the channel called la Passe du Singe. The narrowest part of this channel, which is between the island Burhou and the Corbet rock, is scarcely *three-quarters of a* mile from side to side.

In approaching Alderney the tides must be carefully considered, and a vessel bound thereto should endeavour to reach it so as to get into the pier without anchoring, and on a rising tide between half flood and high water. In running from the southward for Alderney, and intending to go through the Passe du Singe, steer for the south-western end of the island, minding to keep the north-western Head of the Clanque within its own breadth of the western side of Les Etats, bearing N.E. ¾ E., by which you will pass to the eastward of a very dangerous rock called La Pierre au Vrach, over which the tide of ebb as well as flood sets very strongly, as well as counteract the strong indraught of the tide between Ortach and Burhou, which, from half flood till half ebb, branches off between the Pierre au Vrach and Ortach, and sets directly through the rocks in that part with great strength. The mark for the Pierre au Vrach is the south eastern head of the Clanque in one with a small stone beacon on the adjacent heights of Alderney, bearing E. ½ N.; the same beacon in one with the north-western Head thereof will clear it on the north-western side above four cables' lengths; and the same beacon open to the southward of the south-eastern Head thereof, the apparent breadth of the three heads will clear it the same distance on its south-eastern side. La Hogue Windmill in one with the Government Telegraph tower will also carry you more than half a mile to the southward of the Pierre au Vrach, and by shutting in the new lighthouse on Cape la Hague with the island of Alderney, you will pass to the northward thereof, though close. This rock, lying one mile and three-quarters nearly from Ortach, and the same distance from the Etats, is right in the fair-way of the entrance to the Passage du Singe, and is only to be seen at low water great spring tides. It is in form, size, and appearance like a small boat, and close to it all round there are 16 fathoms water. Having passed Les Etats, the next danger to be apprehended is the Corbet rock, between which and Les Etats lie the Barsier and Cariole.

When abreast of the Corbet, bring the eastern end of Braye beach, called Roselle Bay, just open to the northward of Cape Grosnez, S.E. b. E. ¼ E., by which you will pass without or to the northward of Les Jumelles. Having reached the length of Les Jumelles, bring the red-tiled Guard-house, called Le Grand Monize, which stands on the extreme of the island, its own apparent breadth open to the northward of Bibette head, S.E. b. E.; this mark, should the Grande Braye be covered, will carry you to the northward thereof. In rounding the Grande Braye to the eastward, allow a berth of two cables' length, and when the Mill, which stands on the heights to the eastward of St. Anne, appears in one with the pier head, S.W. ½ S., you are to the eastward of it. Having passed the Grande Braye, and bound into the pier, run in with the latter marks in one, until Ortach begins to shut in with Point Grosnez; you will then discover the small iron beacon on the western side of the entrance, in rounding which, allow a berth of at least a ship's length. There is a good passage between the Grande Braye and Bouillonnaise, close to the latter rock.

The best time to enter the pier is on a rising tide, between half flood and high water, there being then less run than at any other period whatever, and you will carry in more than 8 feet water between the beacons. Each of the beacons has a circular eye on its top. The Magazine which stands on York fort, above the lower town, in one with the pier head, will lead you between the two beacons.

Between Burhou island and the Casquets lies a remarkable huge mis-shapen rock, called l'Ortach, between which and Burhou are scattered many dangerous sunken rocks and ledges. There is also a ledge of sunken rocks only a quarter of a mile to the westward of the Ortach, on which there are but 14 feet water.

CASQUETS.—Nearly 6 miles N.W. b. W. from Alderney telegraph lie the Casquet Rocks, between which and Ortach is the strait called La Passe d'Ortach, or the Casquet Channel. This channel, as well as the Singe Passage, during spring tides, abounds with broken water, even in the calmest weather; but it is produced solely by the rapidity of the tides, the whole space between Ortach and the Casquets assuming the appearance of a continued reef of rocks, though only in appearance. On the largest and highest of the Casquets, three stone light-houses are erected in a triangular position with respect to each other, and are all

fitted with revolving lamps. The bearings of the lighthouses one from the other are as follows: viz., from the south-eastern to the north-western lighthouse, N.W. ½ W.; from the north-western to the north-eastern lighthouse, E. ½ N.; and from the north-eastern to the south-eastern lighthouse, S.W. ¾ W. The three lights will consequently appear as but two, when viewed in either of those three directions. The summit of the lighthouses are all at the same height, 120 feet above the level of the sea. The lights may be seen in clear weather upwards of 5 leagues. The Casquet Rocks are bold-to.

A little more than one mile S.E. b. E. ¾ E. off the Casquets, lies the rock called Le Quest, and a third of a mile to the south-westward of Le Quest, are Les Frouquies.

In going through the Casquet channel, be careful to keep well over towards Ortach, that is, one-third nearer to Ortach than to the Casquets, by which you will avoid Le Quest and Le Pommier.

The Casquet channel should never be attempted on an ebb or south-western tide, from the northward, except in case of emergency. The long western mark to clear Les Masqueraux, Pierres de Bût, and all danger on the northern side of Burhou island, Nannels, &c., is the Casquet Rocks their own apparent breadth open to the northward of La Verte-Tête, W. ½ N., which is the most north-western rock of all those in the neighbourhood of Burhou, and never covers. The mark to clear all danger on the eastern side of Burhou, Nannels, &c., is the western Mill on Alderney open to the eastward of the stone Guard-house on Mont Torgee, S. The impetuosity of the tides renders any attempt at anchoring in the vicinity of the Casquets rather hazardous, and the water is very deep.

Between Alderney and Cape la Hague is the strait called the Race of Alderney, or Raz Blanchard; the stream in which, when running to the south-westward during spring tides, was found to exceed the rate of 6½ miles per hour, and during the neaps nearly 5.

There are many dangerous patches of rocks on all sides of Alderney; those which are to be most apprehended on the eastern side of the island are, as has been already observed, the Boufresses, Brinchetais, and Blanchard. To clear the Boufresses, Brinchetais, and Blanchard, the Coquelicot rocks should be opened out their own apparent breadth to the southward of the Etart, W. ¼ N., but no more, as three unconnected rocky patches have been discovered to the south-eastward of Longy, stretching off as it were from the tails of the Brinchetais and Blanchard at the several distances of half a mile, three-quarters of a mile, and one mile and a quarter from the latter.

A large bank is growing up to the southward of the Coquelicot, on which as little as 6 fathoms may be found.

Boni may be avoided on the southern side, by not approaching Alderney nearer than one mile. The Coquelicot, Noires-Putes, and Orbouée rocks should not be approached within 2 cables' length, nor Les Etats within 3.

The north-eastern side of the island abounds in dangers: those most to be feared are Le Sauquet, La Plate, Le Grois, and a rocky ledge to the north-westward of the former, nearly a quarter of a mile from the shore. The three former appear at low water ordinary spring tides, but the latter is always covered. The Grois covers at three-quarters flood.

In running or beating down the Race of Alderney to the south-westward for the Great Russel, great care must be taken to avoid the Banc de Chole. It lies nearly in the direct line between the Great Russel and the Race of Alderney, and for its middle and shoalest part take the following bearings and distances: viz., Alderney Telegraph Tower N.N.E. ½ E., 7¼ miles; Casquet Lights N. b. W. ¼ W., 10¼ miles; Sercq Windmill S.W. b. W., 10¾ miles. This shoal is a composition of sand, gravel and various shells; it extends W.S.W., and is nearly 6 miles in length and 1½ in breadth, having only 10 feet water on its middle.

The direct course from the Race of Alderney to the Little Russel is W.S.W. ¾ W., and from the Casquets thereto is S.W. ½ S. nearly. If bound from the Race or Casquets to the Little Russel, between the periods of low water and half

flood, and of high water and half ebb, allowance must be made for the tide, which obliquely crosses the courses during those periods.

About 3 miles south-eastward from the Casquets, and the same distance south-westward from Ortach, there is a small bank, composed of coarse sand with pieces of shells of different sorts, extending about 1¼ miles N.W. and S.E. nearly, the two ends thereof inclining to the southward.

The TIDES in the neighbourhood of Alderney, with the exception of the Race, Singe, and Casquet Channels, are subject to the same changes as those in the vicinity of the other islands. Along the southern side of the island, between the Orbouée rock and the Hommet de Longy, there are nine hours of eastern and but three of western tide. The former stream commences one hour before low water, and runs along the land towards Longy during the whole flood, and until two hours' ebb again; in the neighbourhood of which, meeting with the south-western stream from the Race, it very suddenly veers and unites therewith. The latter stream commences at two hours' ebb, and sets towards the Orbouée for three hours, or until five hours' ebb, at which time it joins the south-western stream from the Passe du Singe. There is also an in-shore tide on the northern side of the island, between the Corbet and Sauquet rocks, and within or to the southward of the vortex of the Singe, running nine hours to the westward and only three to the eastward; the former stream commences one hour before high water, and the latter at two hours' flood. These two tides are exactly the reverse of each other.

The stream in the Race of Alderney is in some degree connected with those of the Great Russel and the Deroute Channels, that is, between the period of half ebb and low water, and of half flood and high water, the south-western stream from the Race running directly into and through the Great Russel and the Deroute, and the north-eastern stream from the latter channels running into the Race. A similar union exists between the streams in the Singe and Ortach, and Little Russel channels; between the periods only, however, of three-quarters' ebb and one-quarter flood, and between three-quarters' flood and one-quarter ebb. The stream in the Race, Singe, and Casquet channels, that is, in their immediate drafts, begins to set to the south-westward at half-ebb exactly, and runs in that direction for six hours, or until half-flood, and the contrary with respect to the north-eastern stream, for there is neither high nor low water slack there. The first 2¾ hours of the south-western stream in the Race, that is, from half-ebb till low water, sets W.S.W., and the last two hours, that is, from low water till half-flood, sets S.W., and the contrary for the first and last 3¼ hours of the north-eastern stream, which, between half-flood and high water, sets very strongly round Cape la Hague. This makes 5½ hours south-western, and 6½ hours north-eastern stream, that is, half an hour's difference between the Race tide and that in the Casquet and Singe passages. The velocity of the north-eastern stream of tide in the Race, during the springs, exceeds 7¼ miles; that of the south-western stream is 6½ miles per hour. The neaps do not exceed 5¼ miles.

The stream of tide in the Singe passage sets straight through both ways, and runs for equal spaces of time: one branch, however, of the flood, to the westward of the narrows, sets through between Burhou island and Ortach: and, to the eastward of the narrows, it veers and sets circuitously round the Pierres de Bût to the north-westward, and both uniting with the Casquet channel tide, and ultimately with that of the English channel, again set to the eastward. The last two hours of the south-western stream in the Singe gradually veers towards the Casquets, as it recedes from the draft of the former passage. The velocity of the north-eastern stream, during the springs, is 7¼ miles; that of the south-western stream 6½ miles per hour.

The stream of tide in the Ortach passage begins to run to the north-eastward at half-flood, but after passing Ortach it gradually veers to the northward, and sets N.N.E., until it again unites with the stream flowing round the northern side of the Casquets. The south-western stream of this channel, which com-

mences at half-ebb, sets right upon the Quest and the Frouquiers, to avoid which the utmost care must be taken. The navigation of this channel is not rendered dangerous from the variety of the tides, but from their rapidity.

The direction of the stream of tide in the immediate neighbourhood of the Casquets, though it preserves its rotary propensity, assumes throughout the twelve hours a more north-westerly and south-easterly inclination than it does nearer to Guernsey, viz.—

SET OF THE TIDE:	On the Eastern side of the Casquets.	On the N.W. side of the Casquets.	W. ¼ S. 4½ Miles from the Casquets.	W. N. W. ½ W. 11 Miles from the Casquets.
From High Water to 1½ hours' Ebb	E. N. E.	N.W. b. N.	N.E. ½ N.	N. N. E. ¼ N.
„ 1½ hours' ebb „ 3 „	E. N. E.	N.W. b. W.	N. b. W.	North.
„ 3 „ „ 4½ „	W. S. W.	S.W.	N.W.	N.W. b. W. ¼ W.
„ 4½ „ „ Low Water .	W. S. W.	S.W.	W. ½ S.	W. ½ S.
„ Low Water „ 1½ hours' Flood	W. S. W.	South.	S.W. ½ S.	S. S. W. ¼ W.
„ 1½ h. Flood „ 3 „	W. S. W.	S. S. E.	S. b. E.	S. S. E. ¼ E.
„ 3 „ „ 4½ „	E. N. E.	North.	S. E.	S. E. b. E. ¼ E.
„ 4½ „ „ High Water .	E. N. E.	North.	E. ½ N.	E. ½ N.

On the south-western side of the Casquets, between the periods of half-ebb and low water, there is an eddy of nearly 2 miles in breadth, and of considerable strength. Between low water and two hours' flood this eddy revolves more to the eastward, as well as increases in breadth; the natural consequence of the obstruction which the Casquet rocks present to the tide being in the latter case increased, because acted upon more directly than in the former; and this eddy continues until gradually weakened and destroyed by the current at half-flood: similar eddies exist also on the north-eastern side of the Casquets, the effect of which are exactly the reverse of the preceding. On the south western side of Ortach there is an eddy of nearly 1½ miles in extent, between half-ebb and one hour's flood, after which period the stream gradually inclines to the westward, on the south side of Ortach setting at two hours' flood directly for the Casquets, until its progress is arrested by the last of the south-western stream in the Ortach channel. There is no eddy of consequence on the north-eastern side of the Ortach. The velocity of the stream in the latter channel differs but little from that in the Singe channel.

It is high water, on full and change days, at the Island of Alderney, Ortach, and the Casquets, at 45 minutes after 6 o'clock, and the vertical rise of the water during the spring tides is 18½ feet only, and during the neaps it does not exceed 10 feet.

The ISLAND of JERSEY is completely encompassed with dangers of every description, which are rendered doubly formidable by the great vertical rise and fall, as well as rapidity of the tides. The most remarkable are the Pierres de Lecq or Paternosters, the Dirouilles, and the Ecrehous, on the northern and north-eastern sides; the Banc de Violet, surrounding the south-eastern angle; and the Minquiers with many other rocks to the southward.

Jersey possesses several good bays or roadsteads; that of St. Aubyn, however, being the best both for capacity and convenience.

ST. AUBYN BAY is on the southern side of the island, and affords excellent anchorage in from 3 to 5 fathoms water, muddy sand with long grass and sea-weed. The whole of this anchorage, though surrounded on every side by rocks, is perfectly free from any ground capable of damaging a ship's cable, and is sheltered from all winds but those from between S.S.E. and W.N.W., and partially even from them. St. Helier is the principal town on the island, and is situated in the north-eastern recess of St. Aubyn Bay. The little town of St. Aubyn with its castle, which gives its name to the bay, stands on the western side, opposite to St. Helier, their distance asunder being about 2½ miles. Both these towns have stone pier-harbours wherein vessels lie aground at low water upon a soft muddy sand. There is also a strong mole-head projecting from the northern side of St. Aubyn castle, forming a sort of basin, in addition to that of the pier, where vessels frequently refit and unload, grounding, however, at low water.

The dangers to be apprehended in going into St. Aubyn bay are as follows, viz., Les Fours' l'Hubaut with a long ledge outside of it, Les Grunes, La Sellette, and Le Grunot, on the western side; La Rouaudière, La Grune St. Michel, l'Hinguette and La Demie du Pas, on which there is a wooden pole, on the eastern side. The Diamond, with La Grune du Port and Le Pignonet, are well within the bay. The passages among these rocks are extremely narrow.

Between Noirmont point and the Sellette rock lies the western entrance into St. Aubyn bay, which is most generally used by vessels of all descriptions. There are, however, two sunken rocks exactly midway between Noirmont point and the Sellette; they appear at low water great spring tides, but at one-quarter flood have not less than 8 feet water over them. They are called the Grand Four and the Petit Four. The Sellette appears soon after half ebb.

In approaching the Western passage from the westward, the first danger to be apprehended is Le Boiteux rock; it lies about half a mile to the westward of La Corbière, and shows at four hours' ebb. Having rounded the Boiteux, which will be effected when the white sand in the Bay of St. Brelade begins to appear open of Point la Moye, steer in a parallel direction along the land towards Noirmont tower, which stands on the lowest part of Noirmont point, the course being S.E. ¼ E. nearly, and minding to give the Corbière rock a berth of at least four cables, and La Frette point a berth of three cables' length; by which precaution you will pass to the northward of the Hubaut, the two Grunes, and the two Fours. The cross mark for the Hubaut is, the western tower in St. Brelade bay in one with a large rock to the westward of La Frette Point, called Rousse, N.N.E. ¼ E. The long mark for the Grande Grune is the Tour d'Auvergne, a remarkable building on the high land to the eastward of St. Helier, in one with Elizabeth Castle hospital, a small red-tiled building standing between the highest part of the said castle and its north-eastern extreme angle, E. ¼ N. For the Grand Four, the Tour d'Auvergne in one with the south-eastern gable of the Barrack, which stands on the south-easternmost part of Elizabeth castle, E. ¼ N.; and for the Petit Four, the Tour d'Auvergne in one with the False Hermitage, nearly E. b. N.; it will then also be in one with the Town-hill Signal-post.

If when abreast of Noirmont tower you bring the Tour d'Auvergne within four times its apparent width of that part of Elizabeth castle whereon the flag-staff is erected, the same mark as for the Diamond rock, E. ¼ N., it will carry you to the northward of the Grand Four and the Petit Four, and to the southward of the Pignonet; and when Mont Plaisir, a remarkable white building standing a little to the westward of the Upper Blanc Pignon, appears in one with the turret on St. Aubyn Castle, N. ½ E., you may haul in for anchorage. You must be careful that the flood tide, which runs like a sluice round Noirmont Point, does not set you upon the Pignonet. This rock, with the Grune du Port, the Rouaudière, and the two Fours, are the only dangers to be apprehended after you enter the Narrows. The two former lie on the northern side of the entrance, and the three latter on the southern.

The Middle passage lies betwen the Grunot and the Grune St. Michel, and is

about half a mile in breadth. The Rouaudière lies nearly in the fair-way of this passage, though consideraly within the outermost rocks.

The Eastern passage lies between La Demie de Pas (on which there is a beacon) and l'Hinguette, and is rather more contracted, from the obliquity of the leading mark, than the Middle passage, though the water is equally deep. There is no safe passage for a large vessel between the Sellette and Hubaut rocks at low water, unless the wind is free.

There is a passage between the Grunot and Sellette rocks, carrying as much water as either of the others, though not exceeding 200 fathoms in breadth; the leading mark through which is the Western Martello tower in one with the western side of La Grosse Roque, on which there is now a beacon, N.N.E.

In coming from the offing in a north-westerly gale of wind, and being obliged to run for shelter to St. Aubyn bay, it would be advisable on a flood-tide to use the western passage, by doing which, you will be sure of obtaining good shelter.

There are channels on both sides of Elizabeth castle leading into the Little road and pier of St. Helier, but they are completely interspersed with rocks, scattered on all sides, and requiring the utmost caution with a large ship to avoid them.

In running for the Little road or pier, to the southward of the Hermitage, if you intend passing to the northward of the Huitriers, bring the church of St. Sauveur twice its own breadth open to the westward of St. Helier church, and run in that direction until the New mill comes in one with the Gros de Chateau; from thence the church of Sauveur in one with the south pier-head, will lead you into the Little road. If you intend passing to the south of the Huitriers, bring St. Helier church twice its own breadth within or to the eastward of the south pier-head, and run in that direction until the flag-staff of Elizabeth castle opens to the eastward of the Hermitage, from whence St. Sauveur church, in one with the south pier-head. When passing on either side the Huitriers give them a berth of half a cable's length. These channels are so narrow that the least deviation from the above marks will prove dangerous. You will at the period of half flood, however, find 16 feet at the very least, over all the rocks that bar the fair-way of these channels (the Huitriers, the Crapaud and the Mangeurs excepted), and there are beacons on the Huitriers and the Mangeurs. During the night keep the low red light which stands on the north pier (a little to the northward of the pier-head), just in sight to the northward of the north pier-head (on which stands a very high white light); this will lead you to the northward of the Huitriers and between the Crapaud and the Mangeurs up to the pier-heads. When passing the Huitriers open the red light somewhat more, and close it again immediately on passing those rocks; but do not on any account shut it in.

There are several rocks scattered to the southward and westward of St. Aubyn castle, most of which appear at low water; but to the eastward of the Castle, as well as to the northward, the ground is perfectly clear. If bound into the Pier of St. Aubyn castle, it is best to wait for half flood or more, according to your draught of water. At half flood you will find no less than 8 feet therein, and at high water 28 in great spring tides. Grouville bay is on the eastern side of the island, between Seymour tower and Montorgueil castle; and though much more capacious, is certainly not so safe to anchor in as the bay of St. Catherine, by reason of the oyster shells and other coarse rocky substances of which the bottom is here and there composed, and the consequent damage to a ship's ground tackling. The dangers which infest this bay are numerous; those most prominent are as follows: l'Equerrière and its appendages in the northern part; Les Burons, with many others, to the westward near the shore; La Noire, La Grande Haisse, Le Giffard, and Les Frouquies de Greve, in the southern part; and Les Bancs du Chateau to the eastward. The latter lie exactly in the fair-way when running for the anchorage from the southward or eastward, and the whole, with many others which dry at low water, form, as it were, a complete shelf of rocks, which extends a great distance into the sea. L'Equerrière, though often awash, seldom wholly covers; and is, therefore, used as a leading mark to clear the Fara and the rocks in its vicinity.

The Chateau banks lie about 1 mile without the anchorage. They extend north-westerly and south-easterly about 2 miles in length, and a quarter of a mile in breadth, and appear in small patches.

Montorgueil castle stands on a high promontory in the north-western part of Grouville bay, and is joined to the main land by an isthmus. Off the village of Gouray, immediately under, and to the south-westward of Montorgueil castle, an extensive pier has been constructed, capable of receiving and of affording effectual shelter to small vessels when forced from their anchors in the bay. Vessels desirous of entering this pier must bring the Tour d'Auvergne its own length open to the northward of Gouray Martello tower, which stands alone in the head of the bay, and run in that direction between the Equerrière and the Ecureuil for the pier entrance.

There are two passages leading into Grouville bay: one from the southward, between Le Banc de Violet and Les Anquettes; and the other from the northward, between l'Equerrière rock and the Chateau banks.

Coming from the northward, and intending to run for Grouville bay, after having succeeded in clearing the Paternosters and the Dirouilles, you must be careful to give the points of Nez du Guet and La Coupe a berth of at least a quarter of a mile when rounding them, in order to avoid the foul ground which projects from each; and by keeping the land at Belle Hogue in sight to the northward of Tour de Roselle N.W., you will pass to the northward of Le Pillon and the dangers in its vicinity; and La Roque tower in one with the Equerrière rock S. W., or fort Henry in sight to the eastward of Montorgueil castle, S.W. b. W. ¾ W., will lead you to the eastward thereof. The Pillon is a small head lying about half a mile to eastward of La Pierre Mouillée. The Fara is a large flat rock lying, with many others, directly athwart the mouth of St. Catherine bay, and appears at half-ebb. The same marks which carry you to the eastward of Le Pillon will also lead you to the eastward of the Fara, as well as over the shoalest part of St. Catherine bank which has only 18 feet on it at low-water great spring tides; and in order to avoid the rocks which lie to the northward and south-eastward of the Equerrière, you must not approach it nearer than 3 cables' length when rounding it on the eastern side, in order to enter Grouville bay. Equerrière rock in one with the northernmost of the Five towers, will also lead you in the fair-way between the Chateau banks and the Fara ledges, till you come within 3 cables' length of the Equerrière.

The Southern channel is much infested with sunken and other rocks, as La Goubinière, La Rousse Platte, Les Anquettes, and La Route en Ville; and it requires the utmost caution with a large vessel to avoid them, even at the period of half-flood. The Anquettes lie about 3 miles to the eastward of La Conchière, and are on the eastern side of the passage.

There are three small insulated patches to the northward and eastward of Les Anquettes, at the several distances of 4½, 5¼, and 7¼ miles from Fort Henry, and which are all situated as it were on a line drawn from the Tour d'Auvergne to the Bœuf, having from 12 to 15 feet water upon them. The first or nearest to the island lies about a mile to the N.E. of the Petite Anquette; the second is situated nearly a mile in a north-easterly direction from the Grande Anquette, from whence Seymour tower is in one with La Motte, and Roselle mill is in one with St. Catherine tower; the third or farthest from the island lies in an easterly direction from the Grand Anquette, from whence Seymour tower appears in one nearly with the Hermitage, and Boulez Guard-house is midway between the two towers of St. Catherine and Archirondel. By keeping the spire of St. Martin's church open to the northward of Montorgueil castle, half the breadth of the Castle, and at the same time open to the south of the little blue slated house which stands on the edge of the cliff abreast of the Grosse Moie, and at the distance of a cable and a half in a northerly direction from the castle, you will pass between these several shoals and the north-easterly protrusions from the Anquettes; and St. Martin church in one with the ruined guard-house on La Crete, will lead you to the northward and eastward of the said shoals.

ST. CATHERINE BAY is on the eastern shore of the island, and to the

northward of Montorgueil castle. Here a harbour of refuge is in the course of construction (1858) which will afford shelter for vessels drawing 24 feet water and under. A pier is completed on the northern side of the harbour which extends from Verclut in the direction of S.E. ¼ E. for nearly half a mile, having a bright fixed light at its extremity, 60 feet above high water. On the south side of the harbour a pier is planned and partly executed, more extensive than the one on the north side; it will cross the Basses de Fara, taking the direction of E. b. N. from the shore. The bottom of this harbour is composed of mud and sand.

BOULEZ BAY is on the northern side of the island, between Belle Hogue point and Tour de Roselle, and affords very good shelter against any wind between W. b. N. and S.S.E. The only dangers in this bay are three patches of rocks, called the Troopers, La Sanbue, and La Grune de Vicart.

ST. OUEN BAY is on the western side of the island, between Cape Grosnez and the point of La Corbière; but in consequence of its exposed situation is only resorted to for the purpose of stopping tide.

The south-eastern end of the Great bank lies rather more than 1 mile north-westward from Corbière point, and from thence extends in the same direction nearly 4 miles, being about half a mile in breadth.

The middle of the north-west Bank lies about 3 miles north-westward from Grosnez. It trends E. b. N., in breadth about half a mile, and in length 1½. The depth of water thereon is from 8 to 10 fathoms.

ST. BRELADE BAY lies on the south-western part of the island, between La Frette point and the Corbière. It is much contracted by the dangers in its vicinity, and is not capable of receiving vessels of a greater draught than 16 feet.

There is, to the south-eastward of La Moye point, a ledge of rocks one-third of a mile in length, called Les Aiguillons: there are 4 fathoms between it and the shore, and 7 fathoms close to its south-eastern side, above a quarter of a mile off shore.

THE PATERNOSTERS lie to the northward of Jersey, abreast of the bay called La Grêve de Lecq, from which the middle or highest part is distant nearly 2½ miles, in the direction of N.E. ¾ N. They trend about east and west, and are in length 1½ miles. The channel between them and the land is very deep and perfectly free from danger, with the exception of one rock which lies to their south-eastern side, called La Grune de Lecq. There is a channel between the Paternosters and the Dirouilles of more than 4 miles in breadth, quite free from danger, with from 7 to 13 fathoms water. The mark to avoid the north-eastern extremity of the Paternosters is Roselle mill so far open to the eastward of Belle Hogue point as to be perpendicular to the low water point S.S.E.; and the mark to avoid the western extremity of the Dirouilles is Verclut point shut in by that of La Coupe S. ¼ E.

By keeping nearer to Jersey than to the Paternosters you will pass to the southward of the Grune.

About 3½ miles in a north-westerly direction of the Paternosters lies Le Banc Desormes; it trends to the north-east about 2½ miles, and is one mile broad, and has on it at low water not less than 12 fathoms.

About 11 miles in a north-easterly direction from the north-eastern point of Jersey, and nearly 14 miles in a south-eastern direction from the Telegraph on Sercq, lies an extensive oyster ground, the various marks for which are as follows, viz., the island of Jethou in one with Bec du Nez (Sercq), Roselle mill in one with the Burons de Dirouilles, and the two high heads of the Paternosters in one with Grosnez point.

TIDES.—Along the northern and southern shore of Jersey, between Grosnez and Belle Hogue point, and between Seymour tower and La Corbière, the whole of the flood runs to the eastward, and the ebb to the westward, each six hours, and according to the trend of the land; the velocity of the springs being about 4 knots, and of the neaps 2 knots.

In Grouville and St. Catherine bays, the tide between half ebb and half flood runs to the southward, and to the northward between half flood and half ebb, and

the same in St. Ouen bay, with a velocity in each at the springs of 4½ knots, and at the neaps of 2½ knots: the streams will consequently meet at the four principal extremities of the island, viz., La Coupe, Cape Grosnez, La Corbière, and La Conchière. About 2 miles W. b. S. from the Corbière it runs as follows: from low water till one-quarter flood, S. b. W.; from one-quarter till half flood, S.S.E.; from half flood till high water, S.E. and N.E. (one branch going to the southward of the island and another going to the westward through St. Ouen bay); from high water till quarter ebb, N. b. E.; from one-quarter till half ebb, N.N.W.; from half ebb till low water, N.W.: the velocity here is about 4 knots during the springs, and 2½ during the neaps. The tide 2 miles northward from Cape Grosnez runs as follows: from half to three-quarters ebb, W.S.W.; from three-quarters ebb to low water, S.S.W.; from low water till half flood, S. and S.E. b. E. (one branch as at the Corbière going through St. Ouen bay, and another to the northward of the island); from 3 till 4 hours' flood, east; from 4 till 5 hours' flood, E.N.E.; from 5 hours' flood till high water, N.E.; from high water till 2 hours' ebb, N.N.E.; from 2 till 3 hours' ebb, W. b. S.; and from half ebb as before: velocity, about 4 knots at the springs, and 2½ at the neaps.

The tides in the Ruau Channel, between La Coupe and the Ecrehou rocks, run fair both ways, viz., from 5 hours' flood till 5 hours' ebb the stream is N. b. W.; and the contrary from 5 hours' ebb till 5 hours' flood; the velocity during the springs being about 5 knots, and that of the neaps at least 3.

The tides in the neighbourhood of La Conchière run with very great rapidity, and produce great spoutings and overfalls. The velocity in a north-eastern and south-western direction may be taken at 6 knots during the springs, and that of the neaps about 4.

The streams of the tide between Guernsey, Jersey, and the Roches Douvres may be stated as follows:—

HOURS OF THE TIDE.	Lat. 49° 12′ N. Long. 2° 38′	Lat. 40° 16′ N. Long. 2° 36′ W.
From High Water to 1 hour's Ebb	N. b. W.	E. N. E.
„ 1 hour's Ebb „ 2 „	N. W. b. N.	N. b. W.
„ 2 „ „ 3 „	N. W. b. N.	N. W.
„ 3 „ „ 5 „	N. W.	W. N. W.
„ 5 „ „ Low Water	W. N. W.	W. b. N.
„ Low Water „ 1 hour's Flood.	S. S. W.	S. b. W.
„ 1 h. Flood „ 2 „	South.	South.
„ 2 „ „ 3 „	S. S. E. ½ E.	S. b. E. ½ E.
„ 3 „ „ 5 „	S. S. E. ½ E.	East.
„ 5 „ „ High Water	S. E.	East.

From the foregoing table it will be observed that the north-western and south-eastern streams appear to predominate, and to run much longer in those directions than any other. The position where the collision of the tides takes place previous to their separating, one part towards the north-eastward and the other towards the south-eastward, seems to be between the above two stations. The former position is certainly in the southern indraft, between Jersey and the Roches Douvres, while

it is equally apparent that the latter station is in that between Jersey and Guernsey. By keeping Sorel point ever so little open to the northward of Pleinmont point you will ensure the latter influence; and by opening the land at La Frette to the southward of the Corbière you will obtain the former, provided that on both these occasions Point St. Martin (Guernsey) bears nearly N.E. ½ N.: a knowledge of this division of the stream may on many occasions have its use.

It must not, however, be supposed that the positions given above for the collision of the tides remain always the same, for in proportion as the south-western stream between Sercq and Grosnez slackens, so this collision not only decreases in effect, but moves to the south-eastward, and subsequently to the eastward, until at half-flood it ceases altogether, at least in that quarter.

The stream of flood sets generally into St. Aubyn bay about N.E.; about east in the neighbourhood of the Sellette rocks.

The bridge or causeway to the northward of Elizabeth castle begins to show itself at half ebb, and the utmost depth on it at high water equinoctial tides is 22 feet. The causeway between Elizabeth castle and the Hermitage is barely uncovered at half ebb, and the greatest depth of water there is 23 feet.

At Maitre Isle (Minquiers) the spring tides, on some occasions, rise and fall 46 feet, and with a velocity of 7 knots; but the ordinary rate of the springs is 6 knots, and of the neaps 4.

The set of the tides about 10 miles W. b. N. of the Deree rock (St. Ouen just appearing to the eastward of the Corbière), and to the eastward of a supposed straight line drawn from Cape Frehel to the Roches Douvres, inclines principally to the north-western and south-eastern quarters of the compass.

It is high water all round the island of Jersey at the full and change of the moon at 10 minutes after 6 o'clock; and the equinoctial spring tides rise 42 feet.

In the offing, between the Casquets and Guernsey, and between Guernsey and Jersey, the first half of the flood tide runs to the southward and south-eastward, and continues so to run until the water has risen three hours by the shore, or half flood; although in the Race of Alderney, the Singe and Ortach channels, the Great and Little Russels, the Deroute channel, and in St. Catherine, St. Ouen, and Grouville bays, it continues more or less to run to the south-westward until that period, making what is termed tide and half-tide with the shore. At half-flood the tide in the former case runs more to the south-eastward, and in the above mentioned channels it sets to the north-eastward and northward; thus having progressively veered from south to north-east during a space of three hours only. At half ebb the whole body of water between Cape la Hague and the Iles de Brehat sets to the westward and south-westward, as well in the several channels above mentioned as in the offing; thus having occupied six hours in rounding the compass between the periods of half flood and half ebb.

SECTION XIII.

THE CHANNEL ISLANDS TO USHANT AND BREST.

VARIATION FROM 22° TO 23° W.

The Isle of Brehat bears from Cape Frehel N.W. ¼ W. about 9½ leagues; but it is necessary to keep more to the northward to avoid some rocks called Les Bouillons and Lejou, about half-way between in the direct course, and are generally under water. Detached reefs extend 4 miles to the north-eastward of Brehat which are dangerous; the outer one is distinguished by a beacon. Gartin and Barnouie are rocks several miles further out, and which uncover in spring tides.

Upon the Héaux de Brehat is erected a fixed light of the first class, which, being 146 feet above the level of high water, may be seen at between 6 and 7 leagues.

THE ROCHES DOUVRES extend from east to west above 2 miles, and consist of 12 rocky heads which are never covered. The highest of them is about the middle of the patch; it is 48 feet above low water, and lies in 49° 6′ 30″ N. and 2° 35′ 14″ W. They lie about S.W. from Guernsey, from which they are distant about 6 leagues. When upon these rocks, the Corbière as Jersey bears E. b. S. and Harroway's point, in Guernsey, N.E. b. E.

About 19 miles to the westward of Brehat lies the Seven isles, which may be seen at about seven leagues off. Upon one is a small fort, the others not occupied. Upon one is built a lighthouse, exhibiting a light which flashes every three minutes for 4 or 5 seconds: during the intervals, a faint light, preceded and followed by short eclipses: elevated 184 feet above the sea, and in clear weather the flashes may be seen between 4 and 5 leagues.

It should be observed that this light might be mistaken for a revolving light on Cape Frehel, but the light of the Seven isles may be distinguished from the other intermittent lights by its showing a fixed light, varied by flashes. It is, moreover, to be observed, that mariners, making this light and steering eastward, in order to pass between the Roche Douvre and the isle of Brehat, cannot fail of seeing the fixed light of the Héaux, above mentioned, which is five leagues and a half eastward from the Isles aux Moines, and 11 leagues N.W. from Cape Frehel.

Harbour lights are likewise exhibited at the small ports of Legue, isles Saint Quay, Binic, Portrieux, and Brehat isle.

The Triagons is a rocky bank partly above and partly below the water, about 5 miles W.N.W. from the Seven Islands, being about 3 miles in length. A ledge, called La Fuillée, lies about a league N.W. ¼ W. from the Triagons. Between them there is a good channel.

The Isle de Bas is separated from the land by a narrow channel. On the western side of the isle is an intermittent light, eclipsed once in a minute, elevated 223 feet above high water, and may be seen from the distance of 27 miles. On

the opposite coast is the small harbour of Roscou, which you may enter from either side, but the passage is difficult from the number of rocks which lie in the way.

MORLAIX is the chief harbour on this part of the coast, but the town lies more than 3 leagues from the entrance of the harbour. It should not be attempted without a pilot if not acquainted with it. Three harbour lights are here shown.

To sail into this harbour, when you have brought the Bull or Saddle to bear W.N.W. ¼ W. about 3 miles, steer for the northernmost point of land on the east of the entrance of the bay, bearing S.E. b. S. nearly, till you come within a mile of the rocks which lie off that point. Then steer S.W. ¾ S. from the Isle Terenes, the small island lying off the point on the east side of the river's entrance. You must leave all the rocks with beacons on the larboard, and the Reguel islands, with the Isles aux Femmes, on the starboard side. From the Isle Terenes, off the Eastern, you may proceed upward till you are above the point on the other side of the river, and anchor in 6 or 7 fathoms of water.

On the west side of Morlaix bay is the small harbour of St. Pol de Leon, frequented only by coasters who lie afloat.

Roche Blanche lies about 6 leagues N.E. b. E. from Isle de Bas; it is never uncovered, but the sea breaks furiously over it in storms at low water, and the foaming of the sea remains some time in sight. The Caskets bear from it E. b. N., distant about 27 leagues. Vessels running up channel, and meeting with this danger; might take their departure from it and thus steer to the northward of the Caskets. Some persons have asserted that there is always sufficient water over this rock for vessels of every draught; but this is doubtful, for the sea would hardly break over it with such violence if covered with deep water. It may, however, put the mariner upon his guard, as the sea foams over this rock, when, in clear weather, the Island Bas is perfectly in sight.

Westward of Isle de Bas, the coast should not be approached too near, as many ledges and rocks extend to the distance of 2 miles from shore; by keeping about 3 miles from shore you will have about 20 fathoms. There is a large sandy bay about 4 leagues to the westward of Isle de Bas, called Ance de Goulven, where you may anchor with the wind off shore. Between this bay and the extremity of the land to the westward, the whole space is full of rocks and shoals to the distance of 2 miles from shore. During the night it is recommended not to approach nearer than 36 fathoms: bottom, grey sand and pebbles.

ABER VRACH BAY is good, but difficult of access, lying about 7½ leagues to the westward of Isle de Bas. Two harbour lights when kept in one lead in. Two leagues from this bay are the Porsal rocks, almost all under water, and distant nearly a league from shore. Although there is anchorage amongst them, the passages are so intricate that no stranger should attempt them.

A remarkable large black rock, called the Four or Oven, always above water, lies about a mile from the land's end of the department of Finisterre, and serves as a mark for vessels bound to Brest within the island of Ushant; its bearing and distance from Ushant are E. ¾ S., 3½ leagues. From Porsal rocks to the Four the coast trends S.W. ¼ S., nearly 2 leagues; the land between of moderate height, but with numerous rocks, many of which lie a mile from shore. Coming towards the shore in night-time, ships should not approach nearer than 45 or 50 fathoms. The ground generally gray sand, with small stones and flints.

USHANT, a steep craggy island, is 4 miles in length from E. to W., and 2 miles broad. On the south-west side of it there is a harbour: the rest of the island is surrounded with rocks, except at an anchorage on the north side. Upon the north-east part is a conspicuous lighthouse, which bears a powerful fixed light, elevated 272 feet above high water, and may be seen in clear weather 6 leagues off.

N.W. ¼ W., 4½ miles from the lighthouse, and nearly N. ¼ E., 3½ miles from the western part of the island, lies a dangerous bed of sunken rocks, called the Basse Callet, and at the distance of a mile from the S.W. point, a rock named the Jument, equally dangerous, being alternately covered and uncovered with *every tide.*

St. Vincent's Channel, &c.—Between Ushant and the smaller islands to the southward, is a channel of more than one mile in breadth, called the Chenal du Frotueur, or Fromveur, and by us St. Vincent's Channel, in honour of Earl St. Vincent, under whose orders it was surveyed. The tide runs through very rapidly, generally exceeding 4 knots. The course through is east; but a passage should not be attempted against the tide. The dangers on the north side do not extend half a mile from the shore.

The range of islands and dangers to the S.S.E. of Ushant extend to the distance of 4 leagues. The westernmost of the dangers are the Pierre Verte, a bank of sunken rocks, which appear at low water spring tides: and the Buffalo. The former lies 5 miles S.S.E. ¼ E. from the S. W. point of Ushant: the latter, or Buffalo, lies S.S.E. 10½ miles from the same point, and has 8 fathoms close to it. Hence to the Black Rocks, upon the westernmost part of the general range of dangers, the bearing and distance are S.S.E. ¾ E. nearly 3 miles: between are from 12 to 29 fathoms.

The Passage du Four is that channel which lies between Ushant and the main. It takes its name from the remarkable rock called the Four or Oven, heretofore mentioned. The distance from the Four to the south point, called St. Matthew's, at the entrance of the bay of Brest, is 12 miles, the bearing S.S.W. You must give the Four a good berth in passing, to avoid a danger called the Bourreau Bank, which is shoal, situated more than a mile to the westward. Upon St. Matthew's Point is a revolving light, the eclipses succeeding each other every half minute; it is elevated 177 feet, and visible 6 leagues. In fine weather the eclipses do not appear total when within the distance of 3 leagues.

TIDES.—In the Passage du Four the tides run very strongly. It flows here, on the change and full days, at half-past four; but in the offing the stream continues to run for 3 hours longer. Between the Isle de Bas and Ushant the flood-tide sets east, and the ebb west; in the Passage du Four the flood runs to the northward, and the ebb to the southward. Spring tides rise at Ushant 21 feet: and upon the coast to the eastward from 24 to 26 feet.

About 10 miles from the Four rock is the point of Conquet, between which are several rocks, particularly the Platresses and the Porcean; the former lies nearly 2 leagues S.W. from the Four Rock: there are also many other rocks in their vicinity. You keep the mid channel by keeping St. Matthew's Point on with the great valley, just within Vintier Point; and when you have brought Treizion Mill E.S.E., the Platresses will be N.W. b. W. from you. The great valley is near Vintier point; to the eastward is a smaller one. About 3 cables' length from Vintier point is Vintier rock, which dries at low water. To avoid it, keep St. Matthew's abbey on with the great valley, until you get close to the shore: then run along within a cables' length. When the small church which stands on Vintier point bears E.S.E. the rock will be W.N.W., 2 cables distant.

In running into Conquet, you will avoid the rocks called the Finisterres, by running close along the shore until you get within the haven, which dries at low water.

Off St. Matthew's point are several rocks, called Les Moines or Monks; to the S.W. of them several others stretching out for nearly a mile. St. Matthew's point from Conquet point is about 2⅓ miles.

A good road lies off St. Matthew's abbey; but be careful of some rocks which lie at the north side. When in, the anchorage is good in 6 or 7 fathoms.

BREST.—In sailing into the harbour of Brest take care to avoid the sunken rock called the Coq, which lies half a gun-shot from the shore, and about 1½ miles to the eastward of St. Matthew's point, with the south end of Benequet isle on with that point. To go to the southward of this rock, steer about S.E. from St. Matthew's point, taking care to keep the north end of Benequet isle open of it, until the mill which stands upon the north land comes to the westward of the trees. To sail to the northward of the Coq, you must proceed from St. Matthew's point along the north land, and when the before-mentioned mill bears N. b. W., and the trees north, you will be past the Coq. The former is much the safer channel.

About a mile and a half E.S.E. from the Coq, and a quarter of a eague to the south of Point Bertheume, is the Buzec rock, very dangerous at low water; you may go on either side of it. The best way, after passing the Coq, is to run along the north shore, at the distance of two cables' length, and thus sail S.E. b. E. ¾ E. across the bay of Bertheume. When you come into the Gullet be careful to avoid the Fillettes, Mingan, and other rocks, which lie off Camaret point, nearly in mid-channel. Carefully avoid also the Bagino or Kergutio rocks which lie near to the mouth of Brest Water, and about 2 cables' length off the north shore; you may go on either side with safety, but it is usual to run to the northward of them; and when Brest appears open of Porzic point, steer directly for it, and anchor there in 8 or 9 fathoms, or more to the southward in from 10 to 15 fathoms. You may also anchor before the river Landernau, or go to the southward and anchor before Launnoe, in from 13 to 10 fathoms. In the latter case take care to keep clear of the Renard bank, which lies about a mile N.W. b. W. ½ W. from Plougestel point, and about 3 miles S. b. W. from Brest.

In Bertheume bay, about 4 miles to the eastward of St. Matthew's point, is good anchoring, with northerly and N.E. winds, in 10 or 11 fathoms. Opposite Bertheume's bay, and about 4 leagues S.S.E. from St. Matthew's point, is the great bay called Douarnenez bay. Between these bays lie many rocks, which must be carefully avoided.

Douarnenez bay is capable of containing the largest fleets, being more than 6 miles broad, and requires only the inspection of the chart to enable the mariner to navigate it with safety.

SECTION XIV.

DIRECTIONS FOR ENTERING THE ENGLISH CHANNEL, FROM CAPT. MARTIN WHITE, R.N.

The water, generally speaking, in the entrance of the British Channel, is from 8 to 10 fathoms deeper towards the French coast than towards the English. The soundings, too, are coarser, the stones are larger, and the different substances altogether more loose and unconnected, and of a paler colour, than on the northern side of the channel.

Remarks on the Soundings westward and southward of Scilly.

The variations in the soundings upon a supposed radius of 6 leagues from Scilly, in any direction between the limits of N.N.W. and S. ¼ W., do not materially differ; the depths are from 55 to 60 fathoms, whence they shoal pretty gradually towards the rocks. The ground to the southward of the islands within the above radius, though in quality nearly the same, is somewhat finer and more tenacious than that to the westward and north-westward thereof. The soundings, however, in both cases, consist chiefly of fine or coarse sandy mixed ground, of a pale white or greyish colour (which becomes coarser and darker-coloured in approaching Scilly), with a mealy surface, interspersed with small stones and pieces of shells; but there is positively no oaze, nor any matter that can be mistaken for it, at or within the above distance from the islands, in any direction; and, moreover, the transition from oazy ground to that of any other quality, northward, westward, and south-westward of Scilly, is always evident, the alterations being manifest even on the distance of one mile.

The variations in the depths, on a supposed radius of 12 leagues from Scilly, in any direction between the bearings of N.N.W. and S. ¼ W., are comprised within the limits of 63 and 67 fathoms. In this particular, however, if oaze forms any part of the ingredients brought up by the lead, you can neither be to the southward of 49° 38′ N., nor to the northward of 50° 17′ N., but must be upon or between those parallels: on the other hand, if when at this distance from the islands, and with these depths of water, or less, the ground be fine or coarse sand, of nearly the colour and consistency of beaten pepper, or light grey sand, or reddish brown sand, with minute pieces of convex shells, or, indeed, of any quality in which oaze forms no part of the compound, you cannot be between those parallels, but must be upon, or to the northward of 50° 17′, or to the southward of 49° 38′, and, by consequence, nearly in the fair-way of the Channel: the character of the soundings is here given, as it exists after a period of moderate weather. A long continuation of gales of wind from the westward and south-westward, particularly during spring tides, has been frequently found to cause a sensible alteration in the quality of the looser surfaces; while those gales which blow from the eastward and north-eastward have as often produced a contrary effect, not only removing the superfluous ground accumulated by the westerly

winds, but also that which is found to be native or peculiar to the spot. This revulsion is very remarkable in the vicinity of the Channel Islands, and not less so off the Start and Lizard: much consideration is therefore necessary in their discrimination, after continued boisterous weather.

In thick weather do not approach Scilly within the depth of 56 fathoms, as you will not then be more than 3 leagues from the rocks.

The best parallel for entering the British Channel is between 49° 15′ and 49° 25′, according to the inclination of the wind; because it is between those limits that the relative situation of your vessel can, with the greater certainty be ascertained, as well in respect to depth of water as to quality of ground (alluding to the discrimination between oaze and sand), and which cannot be so well defined in any other latitude intended to be made the approach to the channel.

Running for the British Channel, upon and between the Parallels of 49° 15′ and 49° 25′.

Between the parallels of 49° 15′ and 49° 25′ the edge of the bank will be found in the longitude of 11° 18′ W., and consequently 65 leagues from Scilly. Here the depths of water will be from 270 to 335 fathoms, and the ground a mixture of sand and dark-greenish oaze. From hence, as you proceed towards the Channel, you will find sand and oaze for 16 leagues further eastward, the depths decreasing very suddenly from 81 and 80 fathoms to 71 and 69, and the ground changing to coarse and fine reddish-yellow sand and shingle.

This is the surface of the Great Sole bank, which thwarts the parallel very nearly at right angles, its length being about 36 miles, and its breadth 9. The southern part of this bank is in latitude 49° 4′ N. and longitude 9° 55′ W., trending thence in a N.N.W. direction. From hence St. Agnes lighthouse bears E. ¾ S., distant 49 leagues; Cape Clear lighthouse N.E. b. N., 42 leagues; and Ushant lighthouse S.E. ¾ E., 65 leagues distant. Passing this bank you will deepen the water in like proportion, and again get sand and oaze, until as far eastward as 9° 30′, when the bottom again changes to clean sand, from whence no more oaze will be obtained all the way into the Channel, so long as the parallel of 49 °17′ is preserved; on the contrary, if oaze forms any part of the ingredients brought up by the lead, after passing the meridian of 9° 30′ upon the aforesaid parallel, you must be to the northward of 49° 17′, as there is no oaze, or any substsnce which can be mistaken for it, to the southward of the said parallel, when eastward of the longitude of 9° 30′ W.

On the parallel of 49° 25′, however, you will find oaze in the longitude of 8° 40′, though you will again lose it when advanced as far as 7° 50′: here the depths suddenly decrease to 62 and 58 fathoms, the bottom being composed of coarse light yellow and dark grey sand alternately with shingle. This is the surface of the Haddock Bank, which thwarts this parallel in a north-easterly and south-westerly direction, and from which Scilly bears E. ½ N., distant 23 leagues. Passing the Haddock Bank, you will again find deeper water, with oaze and sand mixed; the former of which substances you will eventually lose six leagues farther eastward, or in the longitude of 7° 20′.

The fair-way of the British Channel, when eastward of Ushant or the Lizard, should always be considered as limited to the respective distances of four and eight leagues from the English coast, if the wind will permit; not only in consequence of the dangers which exist on the opposite coast, but because the soundings increase and decrease more progressively on the English coast than on that of France, insomuch that, with reference to the above limitations, the depths of water between the different meridians may be calculated upon with certainty to vary in the undermentioned proportions, viz.:—

Between the meridian of the Lizard	and	that of the	Start	. . . . .	2 fathoms every 5 leagues.
,, ,,		Start	,,	Lyme Regis . . .	3 fathoms every 4 leagues.
,, ,,		Lyme	,,	Portland	no variation.
,, ,,		Portland	,,	Dunnose	varying from 28 to 36 faths.

A close attention to the peculiar character of the soundings mentioned in the

preceding part of these instructions, together with the remarkable ripplings and overfalls which so universally prevail, even in the finest weather off the French shore, will always demonstrate your position, as to whether you are northward or southward of the Channel fair-way. Should you, however, from unavoidable contingencies, after being as far eastward as the Start, in your progress up the Channel, be thrown to the southward of the fair-way, or should a scant southerly wind, with indications of a gale, make it necessary for you to court an offing to the southward, and in doing so you find the water suddenly deepen from 37, 39, and 40 fathoms, to 50, 55, and 60, you may conclude, with great confidence, that you are in the stream, or parallel of the Casquets, or very near it, and either in Melville Pit, or in Hurds Dyke; and, in either case, should haul or edge to the northway into the fair-way, carefully bearing in mind the set of the tide. The centre of the former pit is 11 leagues to the westward of the Casquets, and is of very small extent; the south-western extreme of the latter is 5 leagues only to the westward of those rocks; it thence trends connectedly round the northern side thereof, in a sort of winding equidistant direction, stretching away north-eastward of Alderney, as far nearly as the meridian of Cape la Hague; and though other local discordances may be traced among the soundings in various parts of the British Channel, yet there are no such corresponding transitions, from shoal water to deep, to be found anywhere else; no doubt, therefore, should ever arise as to position.

On the parallel of the Fasnet, and in the longitude of 11° 34′ W., are 286 fathoms water, the ground is a sort of fine dark viscous brown sand: this is the edge of the bank. Thence, as you proceed eastward, the depths decrease very suddenly. In the longitude of 11° are 96 fathoms very fine dark sand: from hence to the longitude of 10° 30′ the depths decrease more gradually, viz., about 4 fathoms every 5 miles, but again decrease very suddenly until within 5½ leagues of the land. Seven leagues westward of Mizen Head there are 60 fathoms oazy ground, and not farther off than 10 leagues, 80 fathoms will be found, the bottom oaze as before.

Vessels bound into the Severn from the Atlantic should endeavour to preserve the parallel of Trevose Head, or that of 50° 30′ N., not only with a view of counteracting the north-westerly and northerly excess of tide which prevails in the Irish Channel, but because the soundings, on approaching it, decrease gradually, and because this promontory projects a considerable distance into the sea beyond the general direction of the Cornish coast. The land also, being very high and steep, renders it the most eligible spot for a landfall between the Lands End and Hartland point, from whence a vessel may with confidence shape a course for the Bristol Channel. On this parallel and in the longitude of 10° 53′ are 140 fathoms fine dark brown sand: this appears to be the edge of the bank of soundings in that latitude. From hence the transition to shoal water is very sudden, as 13 miles farther eastward are only 94 fathoms. This depth is in the longitude of 10° 32′ W., and as you proceed easterly the depths more gradually decrease. In longitude 9° 44′ are 71 fathoms, very fine dark grey sand, of the consistency of beaten pepper; 7 leagues farther eastward are 71 and 69 fathoms also; the latter soundings are, however, oazy. Seven miles to the north-westward of the latter position, and 6 miles eastward of the former, are 59, 55, and 53 fathoms: this is the western extreme of the Nymph Bank; and 4 and 11 leagues southward of the former position, lie the south-western extremes of the said bank, in 60 and 64 fathoms. Proceeding easterly from the former position, you will retain nearly the same depths until you advance as far as the longitude of 8° 26′, where you will find as little as 53 and even 45 fathoms, coarse tenacious light ground, consisting chiefly of mutilated shells and minute stony particles, and you will almost immediately afterwards drop into 65 and 69 fathoms oazy ground. The former is the shoalest part of the Nymph, and is distant from Scilly 29 leagues, in the direction of N.W. ¼ N., 43 leagues from Trevose Head N.W. b. W. ½ W., and 22 leagues S. b. E. from Cape Clear; to the eastward of the latter depth, the soundings shoal pretty gradually towards the western coast of Cornwall, nine leagues from which are 34 fathoms.

The Nymph Bank is nearly midway between the English and Irish coasts. There are only 45 fathoms on its shoalest part, which is in latitude 50° 32′ N., and longitude 8° 26′ W. South-westward of this, the soundings vary from 50 to 60 fathoms. This bank shoals in irregular, uneven patches, taking its rise in the vicinity of the Hook lighthouse, and thence trending along the Irish coast round Cape Clear, even as far westward as the meridian of Dursey island. It is very steep, particularly on its south-eastern and western edges, and the quality of the ground thereon is principally, though not wholly, that of coarse and fine sand; in some places, however, oaze will come up with the lead. Indeed the deeper parts are wholly oaze, though not very tenacious. The tide causes numerous ripplings on all parts of this bank, and when the wind blows strong, the sea breaks heavily, particularly when opposed to the tide.

The soundings upon a supposed radius of 16 leagues from the Smalls lighthouse, in any direction between N.W. b. W. ½ W. and S.W. ½ S. are nearly wholly oaze, or sand mixed therewith. To the north-westward, as well as to the eastward of these limits, the bottom suddenly becomes a sort of dark-reddish sand, which ground is the peculiar criterion of an approach to the Bristol Channel. In running from the westward for the mouth of the British Channel, therefore, if the ground brought up by the lead be oaze or sand mixed therewith, you cannot be to the southward of 50° 57′ N., but must be to the northward of that parallel, and to the westward of the meridian of Grasholm, let the depth be what it may. If, on the contrary, the soundings are wholly free from oaze, you must be to the eastward of the latter meridian. The transition from oaze to sand in the neighbourhood is so evident that it cannot be mistaken.

On the parallel of Sicily the transition from deep to shoal water is very sudden. In longitude 10° 53′ there is no bottom with 190 fathoms of line, and 10 miles farther eastward there are but 84; here the bottom is dark brown sand. This depth is 59 leagues from Scilly. Proceeding on this parallel, the depths fluctuate between 79 and 69 fathoms, as far eastward as the longitude of 9°, where there are 67 and 59 fathoms, ground wholly sand (the northern part of a small knoll which exists in this neighbourhood, called Cockburn Knoll); from whence to the longitude of 8° 20′ the soundings rather increase, and again decrease towards the longitude of 8°, near which meridian you will suddenly fall upon 40 and 39 fathoms: this is the south-western edge of the Jones' bank. The shoalest part of this bank is in latitude 49° 53′, and in longitude 7° 58′; it is consequently distant from Scilly 21 leagues, and in the same latitude with those islands. From Cape Clear it is distant 36 leagues in the direction of S. ¼ E., and 47 leagues N.N.W., ½ W. from Ushant. This bank is 20 miles in length, and from 2 to 6 in breadth, and trends as near as possible S.E. b. E. ½ E. and N.W. b. W. ½ W., shoaling in patches. It has from 39 to 50 fathoms water upon it, and from 65 to 70 very close all around it. The quality of the soundings upon Jones' bank is that of fine and coarse grey and yellow sand instead of oaze, interspersed with brittle shelly substances and minute yellow, reddish, angular stones, but the ground around it is wholly oaze. There are several other small knolls or banks between it and the Nymph bank. though none have less water than 55 fathoms. The tide causes universally great ripplings on all parts of this bank, but particularly between the periods of four hours' ebb and high water. There is no bank or shoal whatever between it and the Scilly islands.

On the parallel of Ushant you are transferred from 200 fathoms to 170 and 95 almost immediately, and then as suddenly into 85 fathoms; the latter depths are situated on the north-western part of the Little Sole bank, and the soundings continue equally discordant until you advance as far eastward as longitude 8°, where they begin to be more regular and progressive. The general direction of the edge of soundings between the parallels of 49° 20′ and 51° 30′ appears to be about N.N. E. ½ E. and S.S.W. ½ W., describing a sort of winding line through and between the above meridians. From the latitude of 49° 20′ the edge of the bank suddenly trends away to the south-eastward. In latitude 48° 55′ and longitude 10° 51′ there are 217 fathoms ground wholly oaze, of a dark-muddy greenish colour; four, five, *and seven leagues* to the south-eastward of which there is no bottom to be found at

230 fathoms. In latitude 48° 40′ and longitude 10° 21′ are 194 fathoms, sand and oaze mixed; and ten miles eastward of this no bottom exists at 200 fathoms. In latitude 48° 28′ and longitude 9° 45′ are 107 fathoms, oaze; and two miles only to the southward of this no bottom could be found at 200 fathoms; alternating in the same manner towards the southern part of the Little Sole bank, from whence the edge of soundings is distant only eight or nine miles.

The southern part of the Little Sole bank is in latitude 48° 18′ N. and longitude of 8° 52′ W., and thence trending in a northerly, north-westerly, and westerly direction, occupies a space of about nine leagues from N.W. to S.E., and nearly the same in an easterly and westerly direction. This bank like the Nymph, shoalens in patches, from 88 to 66 fathoms, all of which are very steep-to, having between them from 90 to 138 fathoms. The shoalest part of the Little Sole bank, 66 fathoms, is 51 leagues N.W. b. W. ½ W. from Ushant light-house, 46 leagues W.S. W. ½ W. from that of Scilly, and 64 leagues S.S.W. ½ W. from the Gallyhead in the county of Cork. The quality of the ground thereupon is wholly composed of coarse or fine greyish sand, mixed with small reddish-black and yellow pebbles and pieces of various shells, covered for the most part with a sort of scaly or hairy incrustation. This bank, as well as the whole extent of the ridge of soundings, may always be discovered in serene weather from the numerous ripplings in its vicinity, and in boisterous weather the transition from deep water to shoal is rendered very apparent by the sudden alterations in the colour of the water, which from blue changes to that of a disturbed green. Passing the Little Sole bank you will have from 95 to 90 fathoms, fine light-coloured sand, and pieces of ribbed shells. Five leagues farther eastward on the same parallel the depths decrease to 88 fathoms, though the soundings are nearly the same in quality: this is forty-five leagues from Ushant. As you approach the latter island the soundings do certainly decrease, though they will be found to vary a few fathoms more or less, viz., at the distance of sixteen leagues from the Ushant, and on the parallel of the island, you will find 72, 71, and 70 fathoms water, a sort of coarse pale yellow ground, resembling semi-indurated marl, with a mealy surface, interspersed with broken pieces of shells, and a substance like chaff. At a distance of nine leagues on the same parallel you will have from 66 to 63 fathoms, the ground of a similar description, and you will find 65 fathoms within three leagues of the rocks. In thick weather, therefore, do not come into less water, when approaching Ushant, than 70 fathoms, and keep the lead going. On the parallel of the Saintes the transition from deep to shoal water is very sudden; in latitude 48° 2′ and longitude 8° 4′, 396 fathoms were obtained, the bottom being dark bluish-grey mud exclusively; and only eight miles to the westward of this position 529 fathoms were found.

From a due consideration, therefore, of the foregoing materials, it will, I think, be manifest, that vessels bound into the British Channel from the south-westward should run well to the northward, when eastward of the meridian of 10°, until oaze forms part of the soundings; and that all vessels bound there from the north-westward should, for the same reason, borrow well to the southward, when eastward of that meridian, until the soundings are free from oaze; thus infallibly ensuring a safe parallel, in the first instance, whereon to run eastward: and as during the prevalence of strong southerly and westerly winds, the tides are warped more astream than usual, and found to run considerably longer, as well as with greater velocity, between the north and west, than at other periods, I am induced to recommend, that when running from the edge of soundings towards the British Channel, upon the parallels of Ushant, Jersey, Trevose head, or Cape Clear, during spring tides, and with the wind blowing strong from between south and west, the compass course should be taken at S.E. b. E. (instead of, as usual, S.E. b. E. ½ E., having in view the preservation of any particular parallel) and this notwithstanding the southing created by local attraction, which in this case will amount to one-fifth of a mile on every five miles of distance.

When running for the British Channel upon either of the above parallels (49° 15′ and 49° 25′), or anywhere between them, if you find the water shoal to 68 and 66 fathoms, with soundings of fine sand, mixed with pieces of fragile white and yel-

low-ribbed shells, and very minute brown angular granite, and other stones of different shapes, unconnected with oaze, Scilly will bear from you nearly E.N.E., and be distant about 13 leagues: the depths for 8 leagues farther eastward do not materially vary or decrease. On the parallel of 49° 25′ you will find 65 and 60 fathoms, actually in the longitude of Scilly: and in the same longitude a depth of 67 fathoms, on the parallel of 49° 15′. Here, however, the soundings will be coarse sand, mixed with rotten rocky substances and flat shells, from whence your course to obtain a sight of the Lizard will be E. ½ S. and its distance thence will be 15 leagues. You will find 49 and 47 fathoms on the meridian of the Lizard, when 4 leagues from it, and 51 fathoms at the distance of 8 leagues therefrom. In running for this position on the before-mentioned course, the depths will shoalen pretty gradually, viz., 67, 63, 59, 56, 52, that is, 4 fathoms every 3 leagues; but the ground, after passing the meridian of Scilly from either of the above parallels, will change to a very pale whitish colour (this is invariably the colour of the ground when to the southward of the fairway, instead of, as generally represented, reddish), resembling that of semi-indurated marl, with a mealy surface, which peculiar quality will continue until as far eastward as the meridian of the Isle of Bas, and thus confirm your relative position in respect to Scilly and Ushant. The soundings on the meridian of the Lizard, in the depth of 51 fathoms, will be ground of a corresponding description, with a variety of broken shells. The soundings off the Lizard, upon and between the supposed radii of 7 and 5 leagues, in any direction between W. ¾ S. and S. b. E. ½ E., do not materially differ, the greatest variation therein being from 51 to 45 fathoms, from whence the depths gradually shoalen towards the point, within 3 miles of which are 40 fathoms water. The soundings at 5 and 4 miles south-eastward of the Lizard are 5 and 4 fathoms deeper, and the ground coarser, than those at similar distances south-westward and southward thereof.

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